THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

VOL. X. No. 219—13th YEAR.] LONDON, MARCH 12, 1861. [Subscription per Ann. { 15s. in Advance / 18s Credit.] Price 8d. Unstamped.

CANNEL COAL.

RAMSAY'S NEWCASTLE CANNEL has become the principal Cannel Coal used in the Metropolis. Its joint products of gas of high illuminating power, and coke of good quality, make it one of the most economical coals known. The Crystal Palace was lighted from it in 1851, and the Post-office, and *Times* Office, are at present.

FIRE-CLAY RETORTS and PIPES.

FIRE-BRICKS (marked "RAMSAY") OF ALL DESCRIPTIONS.

G. H. RAMSAY, Broad-chare, New-castle-on-Tyne.
Manufactory established in 1801.

SUNDERLAND GAS-WORKS.

TO IRON ROOF BUILDERS, ENGINEERS, IRON-FOUNDERS, &c.

CONTRACTS NOS. 4, 5, 6, 7.

THE Directors of the Sunderland GAS COMPANY are desirous to receive TENDERS for the several Malleable Iron Roofs, Cast-Iron Columns, Girders, Flooring, Hydraulic Mains and Connexions, Scrubbers, Washers, Condensers, Purifiers, &c., required at their intended new Station at Hendon.

Drawings and Specifications may be inspected at the OFFICE of the COMPANY, 61, Fawcett Street, SUNDERLAND, and at the OFFICE of T. HAWKSLEY, Esq., C.E., 30, Great George Street, WESTMINSTER, S.W.

Tenders must be delivered at the Office of the Company on or before Tuesday, the 2nd day of April.

The Directors do not pledge themselves to accept the lowest or any Tender. By order,

JOHN H. COX, Secretary.

Sunderland, March 13, 1861.

ON SALE, at the Russell Street Station of the SUNDERLAND GAS COMPANY, 81 Feet of ⊂-shaped Hydraulic Main, 17 in. × 17 in. Mouthpieces, Ascension-Pipes, and other Connexions for 70 Retorts.

1 Set Square Condensers.

1 Set Organ Do.

1 Washing Vessel, 12 ft. × 5 ft. × 1 ft. 9 in. deep, on Cast-Iron Frame.

4 Dry-Lime Purifiers, 8 ft. square, with Centre-Valve.

1 Gasholder, 38 ft. diameter × 18 ft. deep, with Framing complete.

Also, a variety of other Apparatus, suitable for a Gas-Work.

Apply to JOHN H. COX, Secretary.
61, Fawcett Street, Sunderland,
March 12, 1861.

WANTED, by a Provincial Gas COMPANY, having about 1800 Meters in use, a METER INSPECTOR.

Applications, marked "Meter Inspector," from persons fully qualified to undertake the duties of the situation, stating salary required, age, present occupation, and with references as to character and ability, may be addressed to Messrs. LAMBERT and SON, Short Street, New Cut, Lambeth, LONDON.

March 11, 1861.

TO GAS-WORK MANAGERS.

WANTED immediately, a Manager to take entire charge of the Kingston-on-Thames Gas-Works. Must have perfect knowledge of Manufacture, Setting Clay Retorts, Gas Fitting, Take Indices of Meters, Collect Accounts, &c.

Salary £140 per annum, with House, Garden, &c.

Apply by letter, with references, addressed to Mr. CHARLES AIRD, Lessee, Gas-Works, Kingston, SURREY.

CLAY Purification of Gas, whereby a total removal of AMMONIA is effected, may now be carried out by all Gas Companies, and made a SOURCE OF CONSIDERABLE PROFIT. Any Gas Company wishing to adopt the process, can have full particulars as to use of patent, &c., on application to ALEX. SIMPSON, Steam Mills, Snow Hill, BIRMINGHAM.

WALCOTT'S NEW PATENT RETORT.

ONE-THIRD saved of Furnace Fuel commonly used. A Six or other sized Bed of Retorts can be changed at once into a Three or Two-Bed, &c., when working or down. "*Furnace fed with two currents of* HEATED *air to intensify combustion.*"

The Fire playing on the back and two side walls, also covering arch in common settings, is permeating on larger-sized retorts. An effectual method devised for destroying the incrustation of Carbon inside Retorts. The patent Retorts and Furnaces are more easily repaired than the common settings.

Prices, Plans, &c., from Mr. GEO. WALCOTT, Gas Engineer, 24, Abchurch Lane, LONDON.

Moneyed Partner wished for Working Patent.

COWEN'S PATENT FIRE-CLAY RETORTS

JOSEPH COWEN and CO.,

BLAYDON BURN, NEAR NEWCASTLE-ON-TYNE,

Were the only parties to whom a PRIZE MEDAL was awarded at the GREAT EXHIBITION of 1851, for "GAS RETORTS and OTHER OBJECTS in FIRE CLAY."

J. C. and Co. have been for many years the most extensive Manufacturers of Fire-Clay Retorts in the United Kingdom; and orders for Fire-Clay Retorts of all shapes and dimensions, Fire Bricks, and every other article in Fire Clay, are promptly executed at their Works as above.

COWEN'S GARESFIELD COAL AND COKE.
Coal and Coke Office,
QUAY SIDE, NEWCASTLE-ON-TYNE.

FIRST PRIZE IN THE PARIS EXHIBITION.

JOHN RUSSELL AND CO.,

THE OLD TUBE WORKS,
CHURCH HILL, WEDNESBURY;
ALMA WORKS,
WALSALL, STAFFORDSHIRE:
and 69, UPPER THAMES STREET, LONDON,

Original Manufacturers of Wrought-Iron Gas Tubes, and Holders of the present Patents; Inventors and First Makers of LAP-WELDED FLUES for Steam Boilers.

J. R. and Co. make all kinds of Tubes and Fittings for Gas, Steam, and Water, and the largest Orders may be executed in a few days.

Gun Metal, and all other kinds of Cocks, Stocks, Dies, and Taps, Galvanised Tubes, &c.

N.B. All Goods thoroughly Tested before sent out, and Warranted.

ON COAL GAS,

BY

THE REV. W. R. BOWDITCH.

Post 8vo., Cloth 2s. 6d.

JOHN VAN VOORST, 1, PATERNOSTER ROW.

WANTED, by the Advertiser, a Situation as MANAGER of a Country Gas-Work. Has had nineteen years experience in the Erection and Management of Gas-Works.

Satisfactory references and testimonials as to character and ability.

Address, P. A. C., care of Mr. KING, 11, Bolt Court, Fleet Street, LONDON, E. C.

TO the Benevolent and Humane.— The undersigned, who is 74 years of age, and has been engaged for about 30 years by several of the Metropolitan Gas Companies in the capacity of Inspector, Surveyor of Mains, and Collector, has lost the use of his eyes by Cataract, and must undergo a critical surgical operation, to prepare for which he will have to incur an expense totally beyond his means. He is consequently compelled to appeal to the generous hearts of his former Brother Officers and Superiors to lend him a helping hand in this sad affliction, and to assist him in recovering one of God's greatest blessings. To those Gentlemen who have generously assisted him during the last twelve months, he tenders his most grateful thanks. The Editor of the JOURNAL OF GAS LIGHTING is acquainted with the particulars of the case, and has kindly permitted reference to be made to him; and it is hoped that the young and able will send their mite to assist in alleviating the sufferings of an old Member of the Profession.

JOSEPH WAKEMAN.

No. 2, Upper Johnson St., Holywell St.,
Westminster, March 5, 1861.

The receipt of the following subscriptions is thankfully acknowledged:—

Chartered Gas Company	£2	0	0
London Gas Company	2	0	0
A. A. Croll, Esq.	4	0	0
Mr. George Anderson	2	0	0
Mr. Thomas Glover	2	0	0
George Lowe, Esq.	1	0	0
Surrey Consumers Gas Company	5	0	0
Mr. T. G. Barlow	2	0	0
Mr. W. Innes	1	0	0
Mr. Laing	1	0	0
Mr. R. M. Christie	1	0	0
Thomas Myers, Esq.	1	0	0
Mr. R. M. Massey	1	0	0
Mr. Henry T. Balfour	1	1	0

BLAYDON BURN AND LOW BENWELL FIRE-CLAY RETORT AND FIRE-BRICK WORKS, NEAR NEWCASTLE-ON-TYNE.

WILLIAM COCHRAN CARR begs most respectfully to thank the Metropolitan, Provincial, and Continental Gas Companies for their patronage for several years past, and to intimate that he has rebuilt and enlarged his extensive premises for the Manufacture of CLAY RETORTS; and that he is now prepared to execute the largest orders with punctuality and despatch. Orders for FIRE-CLAY RETORTS, of all shapes and sizes, FIRE-BRICKS, and all other Articles in Fire-Clay, executed on the shortest notice, and on the most reasonable terms.

London Agents:
JAMES LAWRIE & CO.,
63, OLD BROAD STREET, CITY, LONDON.

TO GAS COMPANIES.

THE Advertiser, aged 24, is open to an ENGAGEMENT. He has had five years experience in a Provincial Gas Company as Clerk, Inspector, and Collector; and can give first-rate references from his former employers.

Address ROBERT WAKEFORD, Gas Office, 7, Prince Albert Street, BRIGHTON.

Now Publishing, in Bi-Monthly Numbers,
Subscription 18s. per annum,

THE AMERICAN GASLIGHT JOURNAL.

The Official Gazette of Light, Heat, Water Supply, and Sewerage.

LONDON: TRÜBNER AND CO., 60, PATERNOSTER ROW.

A GENTLEMAN who has obtained Contracts from the Municipal Authorities of two French towns, on the seaboard of the Mediterranean, for lighting them with Gas, under very favourable terms, is desirous of associating himself with a Manufacturer or Capitalist, who will carry out these undertakings with the *concessionnaire* upon the basis of mutual profit. References given and required.

Address A. Z., Messrs. POTTLE and SONS, Royal Exchange, LONDON.

WANTED, by a Young Man, a SITUATION, either in the Governor or Engine-house. Has a practical knowledge of Gas making. Five years good character.

Address J. O. F., care of J. C. GOUGH, 27, Store Street, BEDFORD SQUARE.

WANTED to Purchase, Two Good PURIFIERS, each about 8 ft. × 7 ft. × 3 ft. 6in., with Centre-Valve preferred. Must be in good condition.

Also, a VERTICAL CONDENSER, with not smaller than 6-in. Pipes.

Particulars and price, with tracings, to Mr. M. ABEL, Gas-Works, Bungay, SUFFOLK.

CONTRACT FOR GASHOLDER AND CAST-IRON TANK.

THE Directors of the European Gas COMPANY (Limited) are prepared to receive TENDERS for the Supply and Erection, at the Gas-Works, Caen, in France—

1st. Of a Sheet-Iron Gasholder, 60 ft. in diameter, and 25 ft. 6 inches deep.

2nd. Of a Cast-Iron Tank 63 ft. 8 in. in diameter and 25 ft. 8 in. high, with Wrought-Iron covered Cone.

Plans and Specifications may be inspected, and further information obtained, on application at the Company's Office, No. 4, Frederick's Place, Old Jewry, LONDON, where Tenders must be delivered on or before the 20th March 1861.

H. M'L. BACKLER, Secretary.

London, March 8th, 1861.

COUNTY and General Gas Consumers COMPANY (LIMITED).—Works at Chertsey, Lea Bridge, Northfleet, Pembroke, Pembroke Dock, Ware, and Walton-on-Thames, producing a gas rental of about £6500 per annum.

Established for the erection of gas-works in provincial towns, or the purchase or leasing of existing works on equitable terms. Application to be made to the Engineer to the Company, Mr. H. P. STEPHENSON, 58, PALL MALL.

TO be disposed of, in consequence of the death of the Proprietor, the Business of Gas Engineer, Contractor, Manufacturer of Gas Apparatus, Gasholders, and Boilers, conducted by the late Mr. T. W. Allsopp, at Castle Donington, near Derby; and also the right and interest of the said T. W. Allsopp of and in the Patent for the "Portable Gas Apparatus" invented by him, which Patent was taken out in September 1859, for the term of three years from that time.

Apply to Mr. THOMAS ALLSOPP, Castle Donington, near DERBY.

JOURNAL OF GAS LIGHTING NEWSPAPER PENNY

THREE
MEDALS AWARDED TO
THOMAS GLOVER'S
PATENT DRY GAS-METERS.

LORD REDESDALE'S "SALE OF GAS ACT."

DRY METERS *VERSUS* WET METERS.

LONDON, February 25, 1861.

THOMAS GLOVER begs to call the attention of Gas Companies and others to a few *facts*, which, if duly considered, must lead to most important conclusions:—

1. That since THOMAS GLOVER commenced to manufacture his Patent Dry Gas-Meters (which is now upwards of 15 years), every Wet Meter Maker of any importance in England has been compelled to manufacture Dry Gas-Meters; and in the JOURNAL OF GAS LIGHTING, of date of 12th of February, 1861, Messrs. William Parkinson and Co., successors to the late Samuel Crossley, advertise that they "intend manufacturing *Dry* as well as" Wet Meters, and it is worthy of particular notice that they intend to do so "after 40 years experience in manufacturing Wet Gas-Meters of such a quality that has enabled them, as they say, to maintain a superiority over all other; and this, be it also particularly noticed, after they had advertised in the JOURNAL OF GAS LIGHTING, January 29, 1861, "their improved low-spouted Gas-Meter with new patent float arrangement, which entirely overcomes the difficulty experienced by ordinary Wet Meter."

2. That it is quite consistent with THOMAS GLOVER'S knowledge that Wet Gas-Meters, called "low-spouted" or "compensating Wet Meters," have already been proved to be incapable of continuous working or registration, and for this reason the manufacturers of these Meters have been induced to seek the repeal of Lord Redesdale's (righteous) Sale of Gas Act.

3. That every year the Patent Dry Gas-Meter manufactured by THOMAS GLOVER has risen in favour with Gas Companies and Gas Consumers, placing him in the proud position of being the largest manufacturer of Gas-Meters in the country.

THOMAS GLOVER guarantees his Patent Dry Gas-Meters to meet all the requirements of the "Sale of Gas Act," to give accurate and unvarying registration with steady lights; and, from their peculiar construction, cannot be tampered with, and may be fixed in open situations even above or below the level of the lights. They work with less pressure than Wet Meters, and are not affected by the most severe frost.

THOMAS GLOVER guarantees to uphold all Meters sold by him for 5 years free of expense to the purchaser, or for a trifling per centage per annum will contract with any Gas Company to uphold their Meters of his manufacture for a series of years; and, at the conclusion of such contract, to lease the Meters all in perfect working order.

N. B.—Agents in several parts of England are wanted. Apply by letter, or personally.

WILLIAM PARKINSON & CO.,

(SUCCESSORS TO SAMUEL CROSLEY,)

COTTAGE LANE, CITY ROAD, LONDON,

Beg leave to inform Gas Companies and others that, having completed the alterations in rebuilding and enlarging their works, they intend manufacturing DRY as well as WET Gas-Meters.

In adding this important branch to their business, W. Parkinson and Co. pledge themselves to use the same quality of materials and workmanship in the Dry as in their well-known Wet Meters, and which for above forty years has enabled them to maintain a superiority over all others.

Owing to the facilities offered by the extension of their factory, a large quantity of both Wet and Dry Meters will always be kept in stock, which will enable them to execute all orders with as much promptitude as hitherto, and thereby gain the same patronage previously extended to them, and which they now respectfully solicit in this new undertaking.

CONTENTS.

	PAGE
Leading Articles:—	
Notes upon Passing Events	139
Circular to Gas Companies	142
Communicated Article:—	
Remarks on Gas from Water, Turf, and Coal	143
Correspondence:—	
Parochial Assessment Bill	144
Register of New Patents:—	
Halter, A., and Dourant, F. D.—Improvements in Flexible Tubes	145
Mather, C.—Improvements in Gas Singeing Apparatus	145
Calvert, F. C.—Collecting Products during Manufacture of Coke	145
Wain, W. H., and Instone, W.—Improved Lamp	145
Kinipple, W. R.—Improvement in Water-Closets	145
Provisional Protections	145
Notices to Proceed	145
Parliamentary Intelligence:—	
Progress of Bills in House of Lords	145
Progress of Bills in House of Commons	146
Local Government Act Amendment Bill	147
Legal Intelligence:—	
Greenwich County Court.—Surrey Gas Consumers Company *v.* Bakewell	147
Guildhall Police Court.—The Chartered Gas Company and the Marine Store Dealer	148
Miscellaneous News:—	
Meeting of the Radcliff Gaslight and Coke Company	148
Meeting of the County and General Gas Company	148
Meeting of the Wolverhampton Gas Company	150
The Metropolitan Gas Supply	150
Royal Institution.—On some Phenomena attending Combustion in Rarefied Air	152
A Good Receipt for Bronze	154
The Manhattan Gas Company of New York	154
Price Current	153

NOTICES.

The subscription is 15s. per annum, if paid in advance during the month of January, or 18s. credit, in two sums of 9s. each, in July and January of each year. Post-Office orders must be made payable at the Charing-Cross Money-Order Office, to William H. Bennett, No. 42, Parliament Street, Westminster.

The next number will be published on Tuesday, March 26, and the subsequent numbers on each successive alternate Tuesday.

Stamped copies, when forwarded by post, must be folded so as to expose the stamp; they are otherwise liable to the full postage charge for letters.

This JOURNAL has been duly registered at the General Post Office for transmission abroad.

All Communications to be addressed to the Editor, No. 42, Parliament Street, Westminster; and orders for Advertisements to the Publisher, Mr. W. B. King, No. 11, Bolt Court, Fleet Street.

THE JOURNAL OF GAS LIGHTING, WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, MARCH 12, 1861.

NOTES UPON PASSING EVENTS.

We have, on a former occasion, remarked that the English people are deeply indebted to the scientific periodicals of France, such as the *Revue des Deux Mondes*, the *Journal d'Agriculture Pratique*, and the *Presse Scientifique*, for the justice done to our intellectual character. Exact and full accounts of what we have contributed to the civilizing arts and sciences, drawn up with the clearness and eloquence for which French writers on science and art are remarkable, provide, among the educated classes, an antidote to the ignorant libels circulated under the endorsement of such men as M. Emile de Girardin—libels in which we are represented as a sort of crafty savages, with a trick of spinning cotton, and a knack of brewing beer. But, even in the scientific society of France, from time to time, the inferiority of the Anglo-Saxon intellect is assumed in a manner and on grounds which sound to our ears more comic than insulting. For instance, at a discussion reported in the *Cercle de la Presse Scientifique*, the honorary secretary, M. Foucou, said that of all branches of art, music was that which corresponded with the most advanced condition of civilization; and that, consequently, the special aptitude for music enjoyed by certain nations, proved that they belonged to races which had been civilized for a much longer period than those whose organization renders them comparatively indifferent to music. In answer to this theory, Dr. Bertillon mentioned the instance of the negro race, who are very musical; *and the English, who have no taste for music, although they have attained a very high degree of civilization.* M. Foucou replied, that the state of civilization which the English have attained is of very recent date. It might be attributed, no doubt, to a special characteristic of the Anglo-Saxon race —"but a large share of English civilization was due to the exceptional circumstances under which it was developed." The most important of these circumstances were the great discoveries made in modern Europe, and especially the extension of the metallurgical arts, the improvements of the compass by the mariners of the North, and, still more recently, the discoveries and inventions which had turned an important part of the subsoil of the British Islands (*i.e.*, coal) into a profitable moving power. "These islands were inhabited by hordes of savages at a time when the races of the '*Midi*'—who are the most musical in Europe—enjoyed a high state of civilization." M. Foucou also observed, *that it was not uncommon to meet with Englishmen and Americans who, although endowed with a high order of moral and intellectual faculties, had certain physical characteristics, such as a "heavy dull look, prominent teeth and cheek bones, ears projecting from the scull, signs of the hereditary transmission of the blood of the primitive Aborigines.*" M. Feline, in reply, thought that the physical characteristics referred to by the previous speaker were not traces of savage ancestors, but signs of the remarkable energy of the Anglo-Saxon race. He also reminded his friend that "this people had produced such men as Newton, Shakespeare, Bacon, Lord Byron, &c." We should not be surprised to hear a party of small squires in the West of England settle among themselves that the peculiarities of Frenchmen arose from their feeding on frogs, or that they were allied by a distant cross with the monkey tribe; but any attempt to trace from Voltaire's sarcasm the savage in the modern Frenchman, would scarcely be ventured on in English literary and scientific society. There can be no doubt that M. Foucou expresses an opinion very common amongst his countrymen as to our intellectual qualities. Voltaire considered Shakespeare as an inspired savage, and other writers puzzle themselves in inventing theories to account for our having excelled, in so many of the arts of civilization, "the Gallic nation, whose genius is so superior to that of every other race." The French author of a history of Steam claims the merit of all the inventions of Newcomen, Savary, Watt, and Stephenson, for Solomon de Caus and Papin, and compares the Englishmen to "pirates enriching themselves with the spoils of the ships they have plundered."

M. Magne, a professor of agriculture, devotes a chapter of his work on live stock to proving that the improvement in breeds of English cattle and sheep are not due to the talent of the people, but to the climate and good luck; and he concludes by saying that, "in all the pursuits in which the success is chiefly due to the labour of man—to science, in fact, which knows neither race nor country, and gives whenever applied the same results—there France is pre-eminent, while the pursuits most prosperous in England are those dependant on coal and iron, on its numerous sea-ports or rivers easily made navigable." We have given these extracts for the benefit of the many Englishmen and Americans who have been in the habit of considering themselves, without contradiction, the salt of the earth.

The same journal that contains M. Foucou's estimate of the Anglo-Saxon civilization also gives one of a series of graphic pictures of the resources of California—a country which remained a desert while under the control of the representatives of an infinitely more ancient and more refined civilization than that of England, but under Anglo-Saxon has in a very few years grown into one of the great producing powers of the world. An authentic return showed that, in November, 1858, in the fourteen mining counties of California, which extends to the foot of the Sierra Nevada, there were 279 quartz mills at work; of these, 119 were driven by steam, 153 by water, and 7 by mules or horses. The capital sunk in these quartz-crushing establishments, including the machinery and appliances, was upwards of half a million sterling. There is reason to believe that the mills at present in work amount to upwards of 450—one mill often serving for several mines or reefs. The first quartz mill was set up in 1851, but the great extension took place in 1855. The most famous quartz vein is the Alison Rauch, in the county of Nevada. It was discovered in 1852, by a party of Irishmen residing at a *placer* in the county of Nevada; but, although the indications of gold were very plain, they did not attempt to work it, as at that time quartz-beds were not considered profitable. In 1852, the example of other

veins of the same character induced them to crush a little, and they soon produced £70 of gold for every ton crushed. This quartz-bed is not only the richest of the many in the same district, but the easiest to crush. In 1859, the author of the paper from which we translate found the Irish mill, with eight weak stamping presses, crushing twenty tons a day, while other mills did not crush more than half that quantity. The average returns of the Alison Rauch are £40 a ton. There are six Irishmen in the partnership, and it is estimated that their reef has already produced £600,000 of gold, of which nine-tenths have been net profit. "These lucky Irishmen are not even able to sign their names, and do not know what to do with their vast fortune. They have built a chapel as a thank-offering to God, and handsome villas for themselves, close to their old *placer;* have raised the wages of their workmen to an unusual rate; and, to kill time, carry the gold ingots themselves to San Francisco. They leave everything to an intelligent overseer, and live very quietly, with an income greater than that of many European sovereign princes."

The enterprising talent of the Californian population is as much displayed in the construction of canals for bringing the water needful for gold-washing, as in their mining operations. The canals in eighteen counties of California, including branches, exceed 8000 miles in length, and have cost about three millions sterling. California, it is well known, not only contains the richest gold mines, but also the richest mines of mercury in the world; and the situation of San Francisco affords facilities for exportation almost daily to Mexico, Peru, Chili, and even China and Australia. Borax is obtained in Californian lakes in quantities sufficient to supply all the demands of America. Next to gold-washing and quartz-crushing, grinding flour and sawing wood by machinery are the principal trades of California. Out of 150 mills, one half were water and the other half steam-mills. In 1858, there were 138 saw-mills, of which 210 were worked by water and the rest by steam. The timber is obtained from the forests that cover the sides and crown the summits of the mountains of the coast range of the Sierra Nevada. They consist chiefly of oak, pine, ash, maple, and, above all, of splendid white and red spruce, of great value for masts and spars, and for house-building. Amongst the manufactories are iron-foundries—steam-engine-building factories—steam-driven machinery for making doors, windows, and casks—sugar-refineries, which obtain their raw material from Manilla and Bolivia—a water and steam-driven paper-mill makes the paper required in the state for all the books printed there, and upwards of 100 newspapers. A manufactory of *maccaroni* and *vermicelli* is carried on, for sale to the miners and exportation to the South American ports, where it passes for the genuine Italian articles. Although there are more than 100 breweries in California, English porter and pale ale are in great demand. Common bricks of very bad quality are made in several counties, but fire-bricks are all imported from England, and fetch a great price. M. Simonin observes, "here you see a State, the creation of yesterday, which is able to manufacture nearly all its principal wants, while the Spanish settlements after an existence of seven hundred years import the smallest articles. The Anglo-Americans are not only more commercially enterprising, but anxious to forward scientific and intellectual progress. An astronomical observatory is about to be erected near San Francisco. Marine charts have been carefully prepared, and the Federal Government annually expends large sums in erecting lighthouses and landmarks along the Pacific coast. "Numerous public libraries have been founded; schools and colleges are frequented with a zeal astonishing even to us, Frenchmen." Among the associations are:—1. An Agricultural Society, with branches in every county; 2. A State Horticultural Society; 3. An Academy of Natural Philosophy at San Francisco; 4. The Californian Natural History Society at Stockton; 5. The State Medical Society; 6. The Mechanics Institute of San Francisco. All these Societies have reading-rooms, libraries, museums, and the greater number hold annual exhibitions. The high state of prosperity of California seems due to the individual liberty and spirit of private enterprise; to this the development of its mining resources is mainly due.

As a complete contrast to M. Simonin's account of a state or colony where every settler transacts his business, and earns his living in the manner that seems best in his own eyes, we will take a description from the *Revue Contemporaine* of Algeria, a colony which for upwards of thirty years has been ruled by a French military despotism, and from the *Revue des Deux Mondes* of the mining district of the Hartz Mountains, which has for centuries been under the control of an intelligent, patriarchal, and essentially German despotism. Algeria, since 1848, has been divided into the military or frontier, and the civil districts: in the one martial law is supreme, in the other, what we should call a bureaucratic despotism, under the control of the governor. For thirty months, between 1858 and 1860, Algeria was placed under the control of a minister sitting in Paris. That minister has recently been suppressed; and, according to the precedent of the previous thirty years, a military man, and this time a rude uneducated soldier, Marshal Pelissier, has been sent with autocratic powers. And yet, for thirty years, the French have never abandoned the idea of making Algeria a colony like Java, or Cuba, or Mauritius. With this view, vast sums of money have been expended in bounties on produce; in loans to colonists; in roads, wells, and public institutions; in fact, in every kind of despotic encouragement, consistent with the total exclusion of liberty, to do anything but what the State first approved. The fertile plain immediately adjoining Algiers grew rich crops under Mahommedan rule, because they employed slaves, but the pestilent climate makes free labour in that district impossible. The French have, by degrees, acquired possession of provinces where almost all tropical and semi-tropical plants will thrive. They have made roads, sunk wells, and established order and comparative safety for travellers and settlers. Among the obstacles to the colonization, for which the French have made such vast pecuniary sacrifices, was the tenure of land among the Arabs. The land was not held individually, but belonged to the tribe, and was virtually the property of the Bey or chief. Usually, each tribe is in possession of more land than it can cultivate. The French have recently decided to divide cultivable land into two portions; the one to be subdivided amongst the Arab cultivators and stock-owners, the other amongst European colonists. A regular survey has been undertaken with this view. Equally formidable obstacles to colonization have been found in a system of monopoly framed on the old Spanish model, which we ourselves once theoretically applied to our American colonies. A great orator once declared, amidst the cheers of the House of Commons, that America had not a right to make even a horse-shoe without the permission of the mother country. Until very recently, the Algerian settlers were compelled, by protective or prohibitory duties, to buy everything from and sell everything to France. These crushing laws had been partly repeated before the conclusion of the English treaty of commerce. But it is still a sort of treason for a colonist to complain of a law or a governor's decree; and, as for a committee of colonists to settle a petition, and prepare a list of grievances, that would be a difficult and dangerous undertaking. The result, as the author of the essay from which we are extracting pitifully complains, is that, "although half a million of emigrants from Great Britain, Germany, and Switzerland, annually proceed to America and Australia, none find the way to Algeria." The idea of a military government outweighs "the numerous advantages which Algeria has over distant colonies;" and he goes on to say what few Englishmen or Germans will agree in, that the foundation for these prejudices has long since disappeared; but that they are carefully perpetuated by the emigration societies of Germany. "The emigration journals of Bremen, of Frankfort, of Rudolstadt, all dwell on the 'rule of the sword.' We can easily understand this feeling of the German people, knowing that their emigrants avoid Canada, in spite of advantages which tempt even United Statesmen to migrate across the border, because they say bluntly that 'they did not leave home, and cross the sea, to be under the flag of a king or queen.'" But although European colonization has failed, there is no doubt that the condition of the Arabs and tribes who have fully submitted has been very much improved. They have found a good market for all their produce; and, under a system of free trade, will become still more prosperous. This is shown by the fact that from 1846 to 1851, a period of close prohibition, the exports were 11 per cent. of the imports; a relaxation raised them to 29 per cent., a farther relaxation to 49 per cent., in 1855. In addition to prohibitive tariffs, Algeria had a system of centralization which would have delighted Mr. Chadwick. "Suppose," said M. Daru, "a road is to be constructed between two given points, the following is the process:—The plan is studied and drawn up by the engineer in

ordinary in a conference with the engineer-in-chief of the district. The plan is then examined by the engineer-in-chief of the department, who makes his observations. The plan is then submitted to a commission of 'Roads and Bridges,' which sits in the chief place of each department, and is composed of the prefect, the engineer-in-chief, and a colonel of engineers. The prefect has to send a report to the Governor-General, with all the details of the first conference, the views of the chief engineer, and the views of the Provincial Council. The Governor-General refers all the documents to a superior commission of 'Roads and Bridges,' composed of the Secretary-General, a reporting councillor, the general of engineers, and an engineer of 'Roads and Bridges.' This commission makes a report to the Governor-General, who notes his opinion, and then submits it to a superior council; and, on the report of one of its members, the council deliberates, and gives its advice. The Governor-General now pronounces his final opinion, and sends the mountain of papers to the minister of war. The minister of war makes a fourth report, and then the decision is conveyed back to the authorities by the series of stages by which it first travelled." If we did not know something of public works in India, we should say that only French military engineers could have contrived such a routine of circumlocution. Prince Napoleon, during his short lease of power, did something to decentralize the Algerian government. In 1860, two steps in advance were made—free grants of land were abolished, arrangements were prepared for selling it in lots (one-third of the price to be paid in cash, and the rest in two years). The free importation of Algerian produce and manufactures into France was for the first time permitted, and the line of custom-houses between the province of Algeria and the South was suppressed, while encouragement was given to caravans by establishing stations in the desert for their halts. Efforts to encourage cotton cultivation in Algeria have been made for many years by enormous bounties, but with very little success. A bounty was given in proportion to the breadth of land cultivated. The Government bought all the cotton at very high, and sold it at very low, prices at Havre. The result was, the colonists paid no attention to quality, and grew as much as they could. By a decree of April, 1860, a bounty is given for cotton cleaned, packed, and marked and exported, and a less bounty by 30 per cent. on bales sent to the government warehouse to be sold on account of the planter. The cultivation of tobacco seems to be one of the successes of Algeria. The independent condition of this branch of agriculture dates from 1859, when the supply succeeded the Government demand. Within the last four years, there has been a very considerable increase in the growth of cereals of all kinds, which would be still further stimulated by a tariff which would allow England to sell as well as to buy in Algeria, and give cotton and hardwares for corn and wool. M. Giraud thinks a French MacArthur could make the future of Algeria with wool as the Scotch one did of Australia, but that would require a clean sweep of all the regulating laws and bounties, and a Governor-General like Macquarrie. The cork-tree forest of Algeria extends over 2½ millions of acres, and is being worked by a company with fair hopes of success.

Altogether, Algeria seems most to require what Dr. Abernethy recommended for the spoiled only child of a rich man—"a little healthy neglect." With land accessible by roads and railroads at easy rates, with the cheap justice the French law provides, with liberty to export and import and trade freely with the Desert, Algeria only requires to be relieved from military despotism and civil meddling to become a most flourishing colony. In equal contrast to the wild freedom of California, and the centralized *and too intelligent* military rule of Algeria, are the patriarchal arrangements under which the mines of the Hartz Mountains are worked. Practically, the Government is the head, although the profits of the mines go to companies, who lease the right of working. The Government settles the wages, the number of working hours, the price, and the conditions of working the mines. But the officers reside on the spot, and administer in the spirit of traditional laws. The object appears to be, not to work out and exhaust each mine, but to make it last as long as possible. The Government of the district is confided to the Mining Council, which enjoys absolute authority. The council is composed of five members. The president is the only one directly representing the Government. One member represents the mines and works of lead, silver, and copper; the second, iron; the third, the forests; the fourth, administrative functions; and the fifth, all litigated questions. Every year the council frames a budget, and makes out plans for great works, to be carried out in a series of years. The children of the miners receive the elements of education in primary schools, and their religious training in the Lutheran Church. The age of infancy is passed between home and the school; the mother reigns over the house; the father, when he returns from the mine, passes his time in perfect repose, recovering from his severe labour. At fourteen years of age, the boys begin to work at the pit-mouths—learning to sort out argentiferous lead, copper, and zinc ore each into separate heaps, and also to again sort them according to their respective richness. The next stage of mining education is in the smelting-works. In the third stage, the young miner descends into the mines. Six times a week, he spends eight hours underground. The communication to the deepest mines is by ladders. There are mines 900 yards deep, and the descent often occupies from one to two hours. Many attempts have been made to introduce manufactures, which would enable the miner to add to his narrow wages during the sixteen hours he is above ground; but they have failed, because the miners are too tired to do anything but rest.

The miner is generally to be found at the window of his cottage, which is often adorned with pot flowers, smoking, passing hours without uttering a word. Sometimes, he amuses himself with breeding and training singing birds. The gaiety of youth soon leaves the miner, and he becomes grave if not melancholy. Yet he has no anxiety for the future; he is always sure of work, and of a pension when disabled or old. Miners receive on an average 10s. a week, some earn 16s. from which 2d. a-week is deducted for the benefit or assurance fund. If disabled for fifteen days, he gets his regular wages, and then about 4s. a week until convalescent, or until he dies. About 4d. a day is also allowed from the fund for each child of a sick or deceased miner under fourteen years old, and half the allowance of the husband to widows. The families of the Hartz miners seldom exceed three children. They are forbidden by the military law of conscription to marry before twenty-seven years old. They live poorly, and their work promotes consumption and other maladies; not unfrequently they are ruptured; but this is not mentioned by the French author. The lead-smelting works create certain horrible diseases. In order to make the miners as comfortable as possible, a special fund, charged on the profits of the mines, is expended in providing them with flour at half price. Flour, grain, and oats are stored in official warehouses for the use of the mining population and the horses employed in the works. Whenever a miner dies, any other miner has a preference as purchaser of the deceased man's house, and the "Administration lends him the capital required at 6 per cent. to be repaid by small instalments." The Hartz miner, having nothing to hope and nothing to fear, generally spends the greater part of his wages in one or two days, and lives badly for the rest of the week; yet he is not given to intoxication. His favourite amusements are smoking and music. The Hartz mountaineers generally excel in playing, when at home, melancholy airs in harmony with their simple and monotonous existence. Although the mining operations are planned so as to put off as long as possible the exhaustion of the mines, they are conducted with the aid of all the refinements of experience and modern science, and with a degree of skill and economy really admirable. Yet, as sooner or later these mines must be exhausted, it may be questioned whether the systematic endeavour to retard the evil day is wise. The Hartz mining district presents, perhaps, the nearest approach to the Utopia of the Christian Socialists that has ever been carried out on a large scale, and yet the result is not satisfactory, if we look from this dot in Germany over the nations of the world, and consider the work man is born to do.

Monsieur Barral announces in his *Journal d'Agriculture* the result of extensive chemical experiments, which if borne out when applied on a large scale, will revolutionize the manufacture of sugar all over the world by producing a large per centage of mercantile sugar from the syrup, without the use of costly, ponderous machinery. The discoverer of this chemical process, is a Monsieur Rousseau, already known in France as the inventor of a mode of extracting sugar used in nearly 200 beet-root factories. The new process is equally applicable to beet-root, and to the sugar-cane. At present, where the sugar manufacture is carried out with the best machinery, as in Cuba, the result is from 10 to 12 per cent. of the sugar contained in the raw cane, and sometimes as much as 18 per

cent. On the old rude process of open pans, not more than 5 or 6 per cent. is obtained. The syrup extracted from saccharine vegetables changes rapidly in the open air, because it contains albuminous substances, and other matter that becomes black or brown from the action of oxygen. M. Rousseau removes the albuminous matters by boiling the syrup, with about a three-thousandth part of its weight of powdered plaster oe chalk. As soon as the liquid reaches a heat of 100 degrees (centigrade), a thick white scum floats on the surface. By decantation, a perfectly clear syrup is obtained. If this syrup were exposed to the air, it would become as black as ink, but by mixing it with 6 or 8 per cent. of its weight of hydrate of peroxide of iron, it is in a few seconds cleared of all noxious particles, and remains permanently colourless. It has then only to be evaporated in an ordinary pan or boiler, to get rid of the water, and the result is crystallized sugar. "The hydrate of peroxide of iron may be easily recovered and used again and again. The plaster or chalk, which has absorbed the albuminous matters of the scum, will be a valuable manure, and the pulp (of beet-root) will form excellent food for cattle. On tropical plantations, planters, without resorting to expensive machinery, will be able to double their produce, and obtain crystallized sugar with three boilers or pans. This may restore the sugar trade of India where labour is cheap, although the cane is poor as compared with the canes of the Spanish colonies. Attempts to establish factories, to which the natives were to bring their coarse brown sugar, failed from a variety of causes, chiefly from the competition of slave-grown sugar. If, under this process, the peasant can be taught to make refined sugar with his own simple utensils, the cultivation may vastly increase, as means of conveyance increase.

We observe in the summary of the report of the discussion on the 12th of February, at the Institution of Civil Engineers, on "the River Wandle: its springs, tributaries, and pollution," an eminent engineer declared that 30 inches was the most suitable depth for agricultural drainage, and quoted the result of the experiments of Mr. Tycho-Wing, in support of this theory. Certainly, on this occasion, the cobbler made the mistake of going beyond his craft. Agricultural drainers started thirty years ago with shallow drains, and it was not until after many a stout battle that drains of 42 inches and 48 inches deep were adopted on tens of thousands of acres. We know many instances of shallow drains being superseded by deep, but none of deep superseded by shallow. As for the story about over-draining, that has arisen where, after deep draining, coarse and aquatic plants have died away, and left pasture land bare—but this temporary evil has been remedied by manuring and sowing with the seeds of fine grasses—no instance can be quoted of cereal or root-crops unable to find their way to the soil beneath four feet drains. When a theory contrary to all the prejudices of such a stubborn race as farmers, has made way and grows daily more and more into use, we may be quite satisfied that it is sound. We could refer to an estate of the stiffest clay in the whole of Sussex which, drained ten years ago 42 inches deep, has stood out triumphantly the driest and the wettest season known since deep draining has been reduced to art. It is certainly odd to hear of new advocates for shallow draining, just at the time when steam having been successfully applied to the plough and the prong—deep cultivation has become possible, and deep draining more essential than ever.

Circular to Gas Companies.

We have given in another part of the Journal a full report of a lecture, delivered at the Royal Institution, by Dr. Frankland, on the phenomena of combustion in rarefied air, as determined by recent experiments, which present several remarkable results. It could not have been inferred from *à priori* reasoning, that a jet of gas or a candle would be consumed equally well in rarefied air as in air of the ordinary pressure of the atmosphere; but experiments prove that a given quantity of gas issuing from the same burner under the same pressure is as perfectly, or even better, consumed in air that is rarefied to eight inches of mercurial pressure, as when it is burned at a pressure of thirty inches. Dr. Frankland's first experiments were made with stearine candles, the comparative loss of which, during one hour's combustion at Chamouni, and at the summit of Mont Blanc, was carefully noted. The average consumption of each candle in the valley was 9·4 grammes, and at the top of the mountain it was 9·2 grammes; there being practically no difference. On returning to England, he instituted a series of experiments, in which coal gas was employed, as being a more constant standard than candles, and with the same result as regards the relative combustion in the air of the atmosphere, and in air rarefied to various degrees of pressure. In these experiments, care was of course taken to keep the flame amply supplied with a constant addition of fresh rarefied air. On collecting the products of combustion, it was found that the quantity of carbonic acid and of water, when the experiments were made in rarefied air, rather exceeded the quantity of those products when the gas was burned under atmospheric pressure. Though the combustion was thus ascertained to be more perfect in the former case, the luminous effect was very different. It was observed, even in daylight at the top of Mont Blanc, that the candles burned with diminished brightness. The blue light at the bottom of the flame, which in ordinary states of the atmosphere is limited to a space about the eighth of an inch below the apex of the wick, reached nearly two-eighths of an inch above the wick on the mountain, and the bright portion of the flame was correspondingly diminished. On repeating the experiments in London with the aid of a Bunsen's photometer, it was ascertained that the light diminished at the rate of 5 per cent, with each successive inch of mercury that was taken from the pressure, until the rarefaction had amounted to about fourteen inches. As the pressure was removed, the condition of the flame also became altered, and it was surrounded by a halo of blue light. On submitting this blue light to analysis by the prism, it was found that the spectrum exactly resembled the spectrum of incandescent nitrogen. Dr. Frankland supposes that the feeble light of the non-luminous flame of hydrogen or of incandescent nitrogen is not diminished by the rarefaction of the air, which only affects the light-giving particles of carbon in the flame; and that the reason why the luminosity of the flame does not continue to diminish in progressive ratio to the diminution of pressure is, that the blue light remains constant at all pressures.

Dr. Frankland's hypothesis of the diminution of the luminous properties of flame in rarefied air is founded on the seemingly paradoxical assumption, that a greater proportionate quantity of oxygen gains admission to the interior of the flame when the air is rarefied. He assumes that the particles of carbon in the flame, on which its luminosity depends, are consumed by the access of oxygen inside the flame, and converted into carbonic acid without being rendered incandescent. In confirmation of the opinion that an additional supply of oxygen produces that effect, he adduced the experiment of the mixture of air with gas before it arrives at the burner, the effect of which is greatly to diminish its luminous power. It might, perhaps, be assumed, he observed, that the cooling of the flame by the rarefaction of the air was the cause of the diminution of light; but that cause is fully neutralized by the opposite effect of the reduced conducting power of the rarefied air. A well-arranged experiment was exhibited to illustrate how much the intensity of light is increased when the cooling influence of the surrounding air is removed. Some platinum wire was heated to a red heat in the receiver of an air-pump, by a small voltaic battery; and, as the air was exhausted, the platinum became more and more incandescent.

The cause assigned by Dr. Frankland for the diminution of the light of flame in rarefied air does not, however, seem very satisfactory; but the fact is undoubted, and it gives rise to additional perplexities in the determination of the illuminating power of gas. It appears that the difference in the illuminating power of the same gas *may vary* 20 *per cent., when tested at the highest and at the lowest points of the barometrical range in this country*, from the effect of the rarefaction of the air alone, without taking into consideration the different densities of the gas at the opposite degrees of pressure. In photometric measurements of the illuminating power, the difference in pressure, it is true, would affect the flame of the standard candle equally with that of the gas, and thus the illuminating power would be comparatively the same; but, in general illuminating effect, the power of the flame must materially vary. We thus become acquainted with another operating cause, which, independently of the quality of the gas, may increase or diminish its average illuminating power, and produce a dimness of the flame, though the gas may maintain comparatively its illuminating standard.

The active promoters of the senseless agitation against the metropolis gas companies are experiencing the fate which sooner or later befals most agitators. The reaction of public feeling daily increases, and threatens to sweep them off the stage whereon they figured, and to consign them to the obscurity of private life. The honorary secretary and the honorary engineer of the managers of the movement worked hard and skilfully to support the agitation, and, as zealous and able servants, deserved their reward; but, such is the ingratitude of mankind that, instead of reward, they are threatened with disgrace and punishment. The proposition of a Hughes and Beal testimonial, that was brought forward by some of their friends, has vanished into thin air—even empty votes of thanks could be with difficulty extracted from two or three vestries—and, instead of uniting in those tributes of respect and gratitude, there is a combined movement by many of the local authorities to reduce the charge for expenses incurred by Messrs. Hughes and Beal to the *minimum* amount which the conscience of the taxing officer of the House of Commons will permit. This operation is to be performed on Saturday next; and, in the meantime, Mr. Beal—sick at heart with such displays of ingratitude, and indignant at the dismissal of his colleague from his recent appointment—has tendered his resignation as member of his vestry, and retires into private life. It may be said of him in his public career, that "nothing so well became him as the leaving it;" and we hope he may be able to steel his mind so strongly against the unkind cuts of his *quondam* friends that they will not disturb his tranquil repose in retirement.

Mr. Hughes, fortunately for himself, is not so thin-skinned as his coadjutor. He can look with philosophic eye on the bursting storm, and as its waves break against him, he can calmly examine the shore to find anything that they have deposited worth picking up. Like the stormy petrel, he delights to fish in troubled waters, but, more potent than that bird of ill omen, he helps to raise the storm by which he lives. His keen perception enables him to scent the gale afar off, and thither he hastens to increase its fury, and then to offer himself as the pilot to weather the storm. The far northern shores of Inverness are not beyond the scope of his vision, and thither he recently went to fan the embers of a dispute between the gas company and their customers into a flame, and the local authorities there, as in London, are now grumbling at having to pay the costs of the struggle; Mr. Hughes's claim for his interference in the matter amounting to the sum of £120. The notoriety he has acquired, at a cost to the metropolitan parishes of £5000, is turned by him to good account to compensate for the unrewarded labours of the Parliamentary campaign. He issues missives in all directions, promoting and encouraging agitation; he offers his professional services, and after riding the storm as long as it can be made to last, he introduces his bill, by which another storm is raised. Those who have retained him look in vain for a *panacea* for their grievances. The Police Commissioners of Inverness and the parish authorities of Chelsea were alike patients or clients of Mr. Hughes, and they are now alike grumbling to pay for services the value of which they cannot appreciate. But those to whom Mr. Hughes's aid was tendered gratuitously are complaining yet more loudly than those whom he has favoured with his bill; for the Parliamentary expenses of the Metropolis Gas Regulation Act are heavier than the private accounts, and the vestrymen fail to perceive the advantages gained by it. They have, however, to thank themselves for encouraging the movement against the gas companies, and we hope that the experience which has been gained of the effects of employing professional agitators, will operate as a caution on all other local authorities to whom Mr. Hughes may offer his asistance.

Communicated Article.

REMARKS ON GAS FROM WATER, TURF, AND COAL.

By Mr. G. Howitz,

Engineer and Manager to the Copenhagen Gas-Works.

About eight years since, a patent was taken out by Mr. Stephen White, of Manchester, for the manufacture of water gas, to which he gave illuminating power—first, by mixing it with gas from rosin, and, in his subsequent processes, by mixing it with gas from Boghead and other cannel coal; the gas thus formed being called hydrocarbon gas. It was asserted, in favour of this process, that water gas is not only an advantageous diluent of the rich gases of cannel coal, but that it possesses a peculiar solvent power, which diminishes the formation of tar, and thus increases the per centage of illuminating power in the hydrocarbon gas. The controversy which arose on that occasion did not, in my opinion, lead to any satisfactory result; therefore, I determined to make further experiments on the subject, with a view to ascertain, theoretically and practically, the cost of making 1000 cubic feet of water-gas, and also to determine the effect of steam, and other substances containing oxygen, on the non-oxygenous hydrocarbon coal tar.

By Mr. White's process, water was admitted in drops into a diaphragm-retort, and the steam being decomposed by contact with glowing charcoal, the gases thus generated were passed over Boghead cannel during its distillation in the retort. Two Frenchmen, M. Gillard and M. Isard, have since applied water-gas to illumination, but in different ways. M. Gillard commences by superheating the steam, and passes it in that state over glowing charcoal, thereby decomposing the largest possible portion of the water employed. The gas, after the removal of carbonic acid by lime, is applied in that state to heat, during its combustion, a net of platinum wire, the incandescence of which produces light. M. Isard also superheats the steam before its decomposition, and then brings it into contact with the vapour of coal tar, and thus produces an illuminating gas which may be burned in the usual manner.

My first experiments were made with water-gas, generated according to Mr. White's process. I employed an iron retort, with two mouthpieces and covers, and one ascension-pipe. Charcoal was placed in the middle of the retort, and water was allowed to fall in drops at the end farthest from the ascension-pipe. In order to determine the quantity of fuel required for the production of 1000 feet of water gas with a furnace of the usual size, heating five retorts, a trial was made during several days by distilling, in the first instance, common Pelaw Main coal in the experimental retort, and the amounts of fuel used, and of coal gas produced, were constantly noted. Afterwards, in experimenting with the water-gas, due correction was made on the above basis, and it was found that 140 lbs.* of coke were required for the production of 1000 feet of water gas, composed as follows:—

Hydrogen	64
Carbonic oxide	18
Carbonic acid	18
	100

The analysis was conducted in the usual manner, by first removing the carbonic acid with caustic potassa, then by the combustion of the remainder in a tube filled with oxide of copper, and the proportions of carbonic acid and hydrogen were deduced from the absorption of the carbonic acid and water. The proportion of hydrogen thus obtained was rather too great; and it could not well be otherwise, for the iron of the retort must have absorbed a portion of the oxygen from the steam. The correct proportions should be—

Hydrogen	60
Carbonic oxide	20
Carbonic acid	20
	100

The quantity of water requisite for the production of 1000 cubic feet of gas of the above quality is 27·4 lbs. A much larger proportion of water was, however, used during the experiment—viz., 77 lbs.—from which it appears that a large volume of steam must have passed through the retort undecomposed. The composition of the gas, as corrected in the above figures, has been adopted in the following calculations, which are based on the theorems established by Mr. J. Thompsen, lecturer at the Military College in Copenhagen.

The heat that gases evolve during their combustion may be taken to represent the proportion recovered from the heat employed to produce them. I can best express this by the term units of heat, which represent the number of pounds of water heated to one degree centigrade. According to Favre and Silbermann—

Hydrogen has a heating power of		34,200 units.	
Carbonic oxide, ditto	„	2,403	
Carbonic acid	incombustible		
600 cubic feet of	hydrogen, weight 3lbs. ×	34,200	= 102,600
200 „	carbonic oxide, 14·15 ×	2,403	= 34,000
			136,600

The amount of heat required for the decomposition of steam, is found by taking the heating power of hydrogen, and subtracting therefrom the amount of heat that is required for the conversion of coal into carbonic oxide, and to carbonic acid in the retort. The conversion of coal to carbonic oxide requires (according to Grassi) 2480 units of heat for every pound of carbon, and its conversion into carbonic acid, 8000 units of heat for every pound of carbon (Favre and Silbermann). Six pounds of carbon being consumed for the production of each, there would consequently be required

* The pound weight mentioned throughout this communication is the Danish pound, which is somewhat less than the English; one English pound being equal to 0·91 Danish.

For carbonic oxide	14,880	units of heat
For carbonic acid	48,000	„
total	62,888	„

which taken from 102,600 gives 39,720 units (*a*.)

The gas is first generated at a very high temperature, (about the melting heat of copper) which may be assumed to be equal to 1000° centigrade; that is consequently the temperature at which the gas leaves the retort, and which it loses by cooling. This amount of heat expressed in units will be as follows:—

3 (weight of hydrogen) × 3·4046 (specific heat) × 1000° =	10·213
14·15 (weight of carb. oxide) × 0·2479 (specific heat) × 1000° =	3·508
22·25 (weight of carb. oxide) × 0·2164 (specific heat) × 1000° =	4·815
(*b*)	18·536

There were, however, in addition to the 27·4 lbs. of water converted into gas, 49·6 lbs. which passed through the retorts without being decomposed, though it was converted into steam, and afterwards condensed. It is evident that it was not exposed to a sufficiently high temperature to decompose it, but the heat could not have been much less than 1000° centigrade. The quantity of heat thus applied and entirely lost would accordingly be as follows:—

To evaporate 1 lb. of water into steam requires 637 units of heat.
To raise the temperature of the steam to 1000°,

would require 900° (1000° − 900°) × 0·475		
(the specific heat of steam)	428	„
	1065	„

Consequently, the number of units of heat required to convert 49·6 lbs of water to steam of 1000° centigrade would be—

$$49{\cdot}6 \times 1065 = 52{,}824 \text{ units of heat } (c).$$

If we now add together the whole amount of heat used, as theoretically determined, viz.—

(*a*) 39,720 units for the heating power of the gas;
(*b*) 18,536 units for loss by cooling the gas;
(*c*) 52,824 units for loss by condensation of undecomposed steam;

the total number of the units of heat is shown to be 111,080.

There were consumed in the furnace 140 lbs. of coke, to produce 1000 cubic feet of impure water gas. Each pound of coke (of Pelaw Main coal) contained 25 per cent. of water, and 5·3 per cent. of ashes; the remaining 69·7 per cent. being carbon. The heating value of the coke used would consequently be 69·7 × 8000; and 1 lb. of coke should be equal to 5576 units of heat. The water in the coke must, however, diminish its heating value, as we must suppose the steam would be evaporated at a temperature of 1000° centigrade. It appears, therefore, from the preceding calculations, that the heat lost in burning each pound of coke that contains 25 per cent. of water would be—

$$0{\cdot}25 \times 637 \times 0{\cdot}25 \times 0{\cdot}475 \times 900 = 266 \text{ units of heat;}$$

so that the real heating value of 1 lb. of coke is—

$$5576 - 266 = 5310 \text{ units.}$$

The next question to be considered is, how much of this heat is used in the decomposition of the water?

One pound of carbon requires 2·666lbs. of oxygen for its combustion; therefore, the combustion of 1 lb. of coke will require 1·86lbs. of oxygen. As only about one half of the oxygen contained in the air is consumed in the furnace, 16·13lbs. of atmospheric air will be required for the combustion of 1 lb. of coke. After the combustion, it weighs 17 lbs., and its specific heat is about 0·24. In order to heat that quantity of air to 1000° cent., there will consequently be lost 1000° × 0·24 × 17 = 4080 units of heat; for the heat above 1000° is alone serviceable. We thus get an efficient effect for every pound of coke of 5310 − 4080 = 1230 units of heat; and, as 140 lbs. are employed, the total effective heating power is 1230 × 140 = 172,200 units (*d*.) The heat required for the production of 1000 feet of water-gas was stated to be 111,080, which, subtracted from the foregoing, shows a difference of 61,120, due to waste of fuel, which amount with coke, I have found exceeds one-sixth, say 20 per cent. = 34,440; and 172,200 − 34,440 = 137,760; there being a loss of 20 per cent. unaccounted for.

Too much importance must not, however, be attached to these calculations, for there are some things which are not, and cannot be, so accurately determined as could be desired. For instance, the heat of the gas and of the steam may possibly be estimated too high; there is also a loss of heat by radiation from the furnace, which is not taken into consideration—but it can only constitute a small portion of the heating power of the fuel. It may, notwithstanding these possible errors, be confidently asserted that sufficient has been adduced for practical purposes to show what a large quantity of fuel is required for the manufacture of water-gas.

If we assume it to be possible to produce water-gas without the escape of any undecomposed steam, the effective heat required would be diminished by 52,824 units, or 51 lbs. of coke; and, in that case, 1000 cubic feet of foul water-gas might be generated with the consumption of 89 lbs. of coke; and the production of 1000 feet of the gas, freed from carbonic acid, would require 112 lbs.

In the *Journal für Gasbeleuchtung*, there is a notice of Gillard's water-gas at Narbonne, the component parts of which are stated to be:

950	feet of hydrogen, weighing	4·75	lbs.
50	„ carbonic oxide, ditto	3·54	„
454	„ carbonic acid, ditto	50·55	„

The total quantity, when freed from carbonic acid, would therefore be 1000 feet. The heat which that quantity of gas can produce in burning is 179,800 units, allowing 171,300 for the hydrogen and 8500 for the carbonic oxide; and the amount of heat required for its decomposition would be:

171,300 (hydrogen units)—3870 (units of 1·56 lbs. of coal)—110,000 (units of 13·75 lbs. of carbonic acid)	57,400 units.
Loss of heat by cooling 1454 cubic feet of gas . .	28,230 „
Total	85,630 „

Twenty-six pounds of coal are also used under the boiler, and 79 lbs. under the retort, for the production of 1000 feet of pure gas, making 105 lbs. If we reckon the heating power of the coal at 6000 units of heat per pound, the total number will be 630,000, or equal to the heat produced by 118 lbs. of coke. If these results be compared, it will be seen that 1000 feet of impure water-gas, produced by this process I adopted, contains 800 feet of gas freed from carbonic acid, which has a heating power of 136,600 units; therefore, 1000 feet of pure gas would give 170,500 units, and would require the consumption of 15 lbs. of pure carbon in the retort and 112 lbs. of coke in the furnace. Gillard's gas, 1000 feet of which had a heating power of 179,800 units, required the same amount of carbon in the retort and 118 lbs. of coke in the furnace, assuming the heating power of the coal used at Narbonne to be 600. It may, therefore, be confidently presumed that no great diminution in the amount of fuel, as above stated to be requisite for the production of 1000 feet of water-gas, can ever be expected.

(*To be continued.*)

Correspondence.

PAROCHIAL ASSESSMENTS BILL.

Sir,—I take leave to call the attention of gas companies to the provisions of the "Parochial Assessments Bill," prepared and brought into the House of Commons by Sir George Lewis and Mr. Clive.

This Bill provides that assessment boards shall be appointed by justices; for the supervision and control of assessments to be made within counties (see clause 4); and by town councils, for assessments made within boroughs not contributing to county rates (see clause 6).

The overseers are required, within three months after the commencement of the operation of the Act, to make a return to the board of all the assessments in the parish; which assessment the overseers may revise, or cause a new valuation to be made, before the valuation list is returned (see clause 17).

Or (clause 18) the board may set aside the overseers, and appoint any other person to revise the assessments, and make out a list.

The list so made out is to be deposited where the rate-books are kept, and the overseers are to give public notice of their being so deposited; in 14 days after the date of which notice, the list is to be deposited with the assessment board (see clause 19); but no provision is made as to how, where, or when, the notice is to be given, save that it must be given on a Sunday.

Any other persons aggrieved at the assessment may give notice of objection within 28 days after the deposit of the list (see clause 21).

The board can hold meetings to hear objections to the list, *on giving 28 days notice to the overseers* (see clause 21); but no provision is made, that personal notice be given to the party objected to, as to when and where the notice to his objection is to be heard; neither is any notice required to be given upon the rate paper, as to where and when any person may appeal against his assessment, before he is compelled to make payment of his rate.

If an assessment board adjourn a meeting for hearing objections, they are not required to give any notice, either public or private, as to when the meeting is adjourned, or the consideration of the objections will be resumed; nevertheless, they are empowered (by clause 22) to make any alteration in any assessment that may seem to them sufficient, and whether any objection is made or not, and either before or after any meeting for hearing objections; and this revised assessment is to be the valuation list in force for the parish, until a new assessment is made and approved by the board (see clause 22).

I do not discover in the Act that any appeal can be made against this revised assessment, nor any objection heard, inasmuch as an assessment altered by the board, before the meeting, would not be the assessment against which notice of objection had been made.

William Dore.

Gas Company's Works, Dukinfield, Feb. 25, 1861.

Register of New Patents.

2038.—Antoine Halter, and Francoise Decorce Widow Dourad, of 91, Rue de Malte, Paris, for "*Improvements in the manufacture of flexible tubes for the conveyance of water, illuminating gas, or other fluids.*" Patent dated Aug. 24, 1860.

The object of this invention is the manufacture of improved flexible tubes, for the conveyance of water, gas, or other fluids, and the invention relates to the mode of manufacture, and to certain means or apparatus applicable for carrying out the same.

The improved tubes are constructed in the following manner. On a mandrill of the intended size of the tube to be produced, iron wire is wound spirally, as if constructing a spiral spring. The wire used is of a diameter proportioned to that of the intended tube, and it is wound regularly on the mandrill so as to get as uniform and regular a spiral as possible, easing the coils to prevent them from clinging too tightly around the mandrill, and allowing the tube to be drawn off when finished. There is then wrapped over the wire three spiral layers of cloth, coated with pitch, gutta-percha, and caoutchouc, or equivalent materials, that is to say, a strip of felt, or band of cloth coated as aforesaid, and of a breadth, precisely, or very nearly three times the diameter of the tube, is wound obliquely upon the wire from end to end of its length, with the edge of each successive turn or coil of the band overlapping the immediately preceding edge, and adhering thereto. The band is first wound in one direction, whereby a first spiral layer or covering is formed; it is then wound on back again, that is in the contrary direction to the first, but still spirally, with the edges overlapping as before, and from end to end, so as to wrap over the first covering, and form a second spiral layer or covering; and then it is wound on spirally, with overlapping edges over the second covering from end to end, but in a contrary direction to the way in which that was wound, and therefore, in the same direction as the first covering, whereby a third spiral layer or covering is produced. The strip or band receives its coating immediately before being wound on, by forcing it through a bath or vessel containing the pitch, caoutchouc, and gutta-percha, or other coating materials used, which are kept heated therein throughout the operation. Around the tube prepared so far, is next wound or wrapped a strip or band of caoutchouc spirally, so as to cover the last covering completely, and the whole is secured together by binding wire over it spirally, whereby the coated coverings, and the caoutchouc wrapping are kept in place, and protected against shocks and accidents of various descriptions.

The means employed for the manufacture of these improved tubes consist of a carriage which may be placed at various angles or inclinations, and is so contrived as to be capable of being guided or moved according to option by hand, or by the arrangement of toothed bevel-wheels, connecting-clutch or contrivance, and chain, the said carriage being also arranged for holding a bath, or supply of coating material, and for keeping the same hot throughout the process by a fire-tray, fire-box, chafing-dish or fire-pan.

2070.—Colin Mather, of Salford, in the co. of Lancaster, engineer, for "*Improvements in gas singeing apparatus*" Patent dated Aug. 27, 1860.

This invention consists of an apparatus for gas singeing fabrics by which the fabrics to be singed are conducted into an oblong chamber, which is divided by a hollow partition; so that when the cloth or fabric to be singed has entered the lower part of the chamber it passes against the curved lower ends of the central hollow partition. The fabric is conducted into and out of the oblong chamber by guide and supporting rollers. It may be caused to enter the oblong chamber from the upper part, and be conducted downwards to the lower part and under the ends of the lower plates or partitions, which is the arrangement preferred; or a fabric may be caused to enter towards the lower part of the chamber, and thence pass more directly under the ends of the plates of the hollow partitions. At the ends or other proper parts of the oblong chamber, there are doors to facilitate getting to the interior of the chamber, and to the fabric passing through the same. There is a gas apparatus used in combination with the oblong chamber by which gas and atmospheric air are supplied in a manner which is well understood when used for other purposes, in order that the gas may be largely mixed with the air before the same is ignited. By this arrangement, there will be no fan or other artificial means of obtaining draft, required; the products of combustion and dust will be carried away by the draft of the chimney, and by reason of burning large quantities of atmospheric air with the gas, and the consequent perfect combustion of the gas, no black or colour-marks will take place on the cloth or fabric singed by the apparatus.

2075.—Frederick Crace Calvert, of Manchester, Professor of Chemistry, for "*Collecting and saving certain products given off or emitted during the manufacture of coke.*" Provisional protection only obtained. Dated Aug. 28, 1860.

This invention may be classed under two heads. First, it consists in conducting the mixture of heated and ignited gaseous products obtained from the destructive distillation of coal in an oven or in ovens of a peculiar construction underneath and around another oven or other ovens, for the purpose of effecting by the heat thereof the distillation of the volatile gaseous liquid and solid products from the coal therein contained. Secondly, the invention consists in conducting the gases and other volatile products produced in the second oven through flues and columns of a peculiar construction, into which diluted acids are introduced in a minute state of division, for the purpose of collecting the ammonia and other condensible products.

2085.—William Henry Wain, of Birmingham, brassfounder, and William Instone, of Wolverhampton, gas-fitter, for "*A new or improved lamp.*" Provisional protection only obtained. Dated Aug. 29, 1860.

This invention consists of a lamp peculiarly adapted for burning spirit or volatile oils, which lamp has an inverted fountain, by means of which any number of lights can be fed. A perforated semi-circular cap is placed over the wick, and the flame is both thrown below the said cap and burns above it. An oval chimney surmounts the burner.

2147.—Walter Robert Kinipple, C.E., of Limehouse, in the co. of Middlesex, for "*An improvement in water-closets, and in flushing tanks or apparatuses.*" Patent dated Sept. 5, 1860.

This invention consists in the employment in water-closet pans or troughs, and in tanks, reservoirs, and vessels for holding liquid, of a hollow conical valve, which, when down, fits into a seat in the bottom of the pan or other vessel, or into a seat formed by the mouth of an outlet-pipe. The valve is free to work up and down upon guides, and a weighted lever is attached to it, the weight being adjustable upon the lever. A constant flow of the liquid into the pan, trough, or other vessel is maintained; and when it rises to a given level, the flotation of the valve, with the aid of the weight on the lever, is so calculated that the liquid floats the valve and raises it off its seat, thus allowing the contents of the pan, trough, or other vessel to flow out with a flushing action. As soon as the liquid has run out, or nearly so, the weight of the valve causes it to descend and to close the outlet until the given point has been again attained.

PROVISIONAL PROTECTION

HAS BEEN GRANTED FOR THE UNDERMENTIONED INVENTIONS.

166.—Jean Baptiste Pascal, of Lyons, C.E., and of 29, Boulevard St. Martin, Paris, for "*Improvements in generating burning gases to be applied as a motive power, and in apparatus for the same.*" Jan. 21, 1861.

348.—Richard Archibald Brooman, of 166, Fleet Street, London, patent agent for "*An improved gas apparatus, intended chiefly for lighting pipes, cigars, and cigarettes.*" A communication. Feb. 11, 1861.

403.—James Bailey Hawkins, of North Street, Limehouse, London, plumber, for "*Improvements in the construction of cocks for drawing off liquids and vapours, and for regulating the flow or passage thereof.*" Feb. 19, 1861.

406.—Thomas Pedrick, of 8, Brighton Terrace, Brixton, London, machinist, for "*Improvements in obtaining and applying motive power by water, and in apparatus connected therewith.*" Feb. 19, 1861.

427.—Charles Maschwitz the younger, of Birmingham, merchant, for "*A new or improved tap or stop-cock for liquids, steam, and gas.*" Feb. 21, 1861.

472.—James Hinks, of Birmingham, manufacturer, for "*An improvement or improvements in glass chimneys for lamps with flat wicks.*" Feb. 23, 1861.

NOTICE HAS BEEN GIVEN OF INTENTION TO PROCEED WITH THE UNDERMENTIONED INVENTIONS.

2532.—Henry Alexander Frederick Duckham, of Terthewey Lodge, Junction Road, Holloway, gas-regulator manufacturer, for "*Improvements in gas-meters and regulators.*" Oct. 17, 1860.

2577.—John Henry Johnson, of 47, Lincoln's Inn Fields, London, and Glasgow, Gentleman, for "*Improvements in apparatus for measuring the flow of liquids partly applicable to ordinary water-cisterns.*" A communication. Oct. 22, 1860.

2600.—William Prosser, of 24, Dorset Place, Dorset Square, London; and Henry John Standly, of 9, Pall Mall East, Westminster, Esq.; for "*Improvements in apparatus employed in the production of light.*" Oct. 25, 1860.

2603.—William Mann, of Barnsbury, London, gas-engineer, for "*Improvements in apparatuses for washing and condensing gas.*" Oct. 25, 1860.

80.—William Henry Moran, of Cologne, for "*Improvements in gas-meters.*" Jan. 11, 1861.

271.—José Joaquin de Arrieta, of Piccadilly, London, Esq., for "*Certain applications of chapapote and its products, and of the same combined with other substances, and of materials treated therewith to various purposes in manufactures and the useful arts.*" Feb. 1, 1861.

Parliamentary Intelligence.

HOUSE OF LORDS.

FEB. 25, 1861.

The Portsmouth Water and the Macclesfield Gas Bills were read a second time.

A petition was presented against the Macclesfield Gas Bill from the clergy, gentry, cotton-spinners, manufacturers, merchants, tradesmen, and other inhabitants of Billington.

The Macclesfield Gas Bill was ordered to be committed.

FEB. 26.

Petitions were presented against the Blackburn Water, from Joseph Murray and others; against the Southwark and Vauxhall Water Bill, from the householders and inhabitants of Richmond; against the Wigan Gas-Meter and Fitting Bill, from the Hindley Gas, Coke, Meter, and Fitting Company, and from the Pemberton Gas Company; and against the Wolverhampton New Water-Works Bill, from the Old Water-Works Company, and the corporation of Wolverhampton.

The Staffordshire Potteries Water Bill was read the first time, and referred to the examiner.

The Whitworth Vale Gas Bill was read a second time, and committed.

FEB. 28.

Petitions were presented against the Atherton, Bedford, &c., Gas and Water Bill, from the London and North-Western Railway Company; against the Blackburn Water Bill, from the mayor, aldermen, and burgesses of the borough of Blackburn; against the Clitheroe Gas Bill, from the Lancashire and Yorkshire Railway Company; against the Dewsbury and Batley Gas Bill, from the Dewsbury Local Board of Health, and Batley Local Board of Health; against the Fylde Water Bill, from the Lancashire and Yorkshire Railway Company, and the London and North-Western Railway Company; against the Portsea Gas Bill, from the mayor, aldermen, and burgesses of Portsmouth; the commissioners for

paving, lighting, and improving the town of Portsmouth; and the inhabitants and consumers of gas within the borough of Portsmouth; against the SWANSEA GAS Bill, from the mayor, aldermen, and councillors of Swansea; against the UXBRIDGE GAS Bill, from the Uxbridge Gas Company, and the Uxbridge District Local Board of Health; against the WIGAN, GAS, METER, AND FITTING Bill, from the mayor, aldermen, and burgesses of Wigan; and against the WOLVERHAMPTON NEW WATER-WORKS Bill, from the Bilston Township commissioners and Local Board of Health, ratepayers and owners, lessees and occupiers of manufactories, houses, buildings, and premises, and inhabitants of Bilston.

The STANDING ORDERS COMMITTEE reported—That the Standing Order, certified by the examiner not to have been complied with, may be dispensed with in respect of the BIRMINGHAM IMPROVEMENT Bill, provided that clause 78 be struck out of the Bill; also, in respect of the BOLTON CORPORATION Bill, provided that clause 37 be struck out of the Bill; also, in respect of the ISLE OF WIGHT WATER Bill, provided the names of William Henry Hewitt and Edward Frederick Taunton be struck out of the Bill; also, in respect of the LUTON WATER Bill, provided that the names of John Everitt and William Henry Cox be struck out of the Bill; also, in respect of the FYLDE WATER Bill, provided that the name of Edward Pedder be struck out of the Bill.

The CLITHEROE GAS; the DEWSBURY AND BATLEY GAS; the PORTSEA GAS; the SWANSEA GAS; and the UXBRIDGE GAS Bills were committed.

MARCH 1.

Petitions were presented against the ATHERTON, BEDFORD, &c., GAS AND WATER Bill, from the Lancashire and Yorkshire Railway Company; against the NORTHAMPTON WATER Bill, from the corporation of Northampton, and the commissioners of paving, &c.; and against the STAFFORDSHIRE POTTERIES WATER Bill, from the Leek improvement commissioners.

The NORTHAMPTON WATER Bill was committed.

MARCH 4.

A petition was presented against the MACCLESFIELD GAS Bill, from the mayor, aldermen, and burgesses of the borough of Macclesfield, acting as the LOCAL BOARD OF HEALTH for the said borough.

The VICTORIA DOCKS GAS; the ALDERSHOT GAS; the ISLE OF WIGHT WATER; and the HASTINGS WESTERN WATER Bills, were read a second time.

The BLACKBURN WATER and the FYLDE WATER Bills were read a second time and committed.

MARCH 5.

The GRAND JUNCTION WATER Bill was committed.

The ATHERTON, BEDFORD, &c., GAS AND WATER Bill was read a second time and committed.

MARCH 7.

The MACCLESFIELD GAS, the WHITWORTH VALE GAS, the CLITHEROE GAS, the DEWSBURY AND BATLEY GAS, the SWANSEA GAS, and the UXBRIDGE GAS Bills were referred to a select committee, consisting of the Earl of Powis (chairman), the Earl of Camperdown, Lord Rollo, Lord Foley and Lord Grinstead, who will sit on Monday, March 11, at eleven o'clock.

MARCH 8.

The Standing Orders Committee reported that the Standing Orders in respect of the STAFFORDSHIRE POTTERIES WATER Bill ought to be dispensed with, provided that clause 28 be struck out of the Bill; and, further, that provision be made that no water be taken from the River Churnet, nor from the stream passing through the field numbered 57, in the parish of Leek.

Petitions were presented against the ATHERTON, BEDFORD, &c., GAS AND WATER Bill, from the Bolton Gas Company, the proprietors of Leigh Gas-Works, the Tyldesley Gas and Coke Company, and the inhabitants and ratepayers of Leigh, &c.; and against the HASTINGS WESTERN WATER Bill, from the Corporation of Hastings.

The HASTINGS WESTERN WATER, and the PORTSMOUTH WATER Bills, were committed.

HOUSE OF COMMONS.

FEB. 25.

The EXAMINER reported that the Standing Orders applicable to the following Bills had not been complied with:—HASTINGS WESTERN WATER, and the STAFFORDSHIRE POTTERIES WATER. Referred to the Select Committee on Standing Orders.

The BOLTON CORPORATION and the DARLINGTON LOCAL BOARD OF HEALTH Bills were read a second time and committed.

Petitions were presented against dispensing with Standing Order 105, in the case of the petition of the Elland Gas Company against the SOWERBY BRIDGE GAS CONSUMERS Bill, from Messrs. Newall and Pike; against the KINGSTOWN WATER Bill, from the Kingstown Improvement commissioners; and 13 against the PAROCHIAL ASSESSMENTS Bill.

FEB. 26.

The BIRMINGHAM IMPROVEMENT and the STOCKPORT DISTRICT WATER Bills were read a second time and committed.

Three petitions were presented against the HIGHWAYS Bill; 21 against the PAROCHIAL ASSESSMENTS Bill; against the BURTON-UPON-TRENT WATER Bill, from the Midland Railway Company; against the KINGSTOWN WATER Bill, from the corporation of Dublin; against the LONDON TRAMWAY AND DISPATCH Bill, from the Metropolitan Board of Works; against the MIDDLETON IMPROVEMENT Bill, from the Heywood Gas Company; against the RYDE WATER Bill, from Admiral Thomas Wren Carter and others, and from Thomas Webster; against the STREET RAIL Bill, from the Dudley and New Inn Road trustees; the Dudley, Birmingham, Wolverhampton, and Streetway Road trustees; the Holly Hall and Pedmore Roads trustees; and the Halesowen and Bromsgrove Roads trustees; and against the TONGE IMPROVEMENT Bill, from the Heywood Gas Company.

FEB. 27.

One petition was presented against the HIGHWAYS Bill; 28 against the PAROCHIAL ASSESSMENTS Bill; against the BOLTON CORPORATION Bill, from the Bolton Gas Company; against the ELLAND GAS Bill, from the owners, &c., of property in Elland; against the STREET RAIL Bill, from the Metropolitan Board of Works, and the corporation of Liverpool; and against the TONGE IMPROVEMENT Bill, from the Rochdale and Manchester turnpike-road trustees.

The LOCAL GOVERNMENT AMENDMENT ACT Bill was read the first time, and ordered to be read a second time and to be printed (49.)

FEB. 28.

Fifteen petitions were presented against the PAROCHIAL ASSESSMENTS Bill; for dispensing with Standing Order 105, in the case of the petition of Earl Fitzwilliam against the DUBLIN CORPORATION WATER Bill, from Messrs. Holmes and Co.; and against the BIRMINGHAM IMPROVEMENT Bill, from the Birmingham Gas Company.

MARCH 1.

The STANDING ORDERS COMMITTEE reported that the Standing Orders ought *not* to be dispensed with in respect of the CARRIAGE TRACK Bill; and the petition of Messrs. Ludlow in the case of the SOWERBY BRIDGE GAS COMSUMERS Bill.

One petition was presented against the HIGHWAYS Bill, and 20 against the PAROCHIAL ASSESSMENTS Bill; against the LIVERPOOL IMPROVEMENT Bill, from the Mersey Docks and Harbour Board; against the STREET RAIL Bill, from the Edinburgh paving board; and against the THAMES EMBANKMENT Bill, from the vestry of St. Martin-in-the-Fields.

MARCH 2.

Petitions were presented against the STOCKPORT DISTRICT WATER Bill, from William Davenport Davenport, and the Stockport Water-Works Company.

The BURTON-UPON-TRENT WATER, and the RYDE WATER Bills, were referred to the committee on group D, consisting of Mr. Hope (chairman), Mr. G. H. Packe, Lord Henley, Mr. Bond, and Mr. Hennessy, who will sit on Tuesday, March 12, at twelve o'clock.

The SOWERBY BRIDGE GAS CONSUMERS, the SOWERBY BRIDGE GAS, the HUDDERSFIELD GAS, and the ELLAND GAS Bills, were referred to the committee on group E, consisting of Sir John Hanmer (chairman), Mr. C. W. Howard, Mr. Butler Johnstone, Mr. Abel Smith, and Mr. Trefusis, who will sit on Tuesday, March 12, at one o'clock.

The DEWSBURY, BATLEY, AND HECKMONDWICKE WATER, and the LIVERPOOL IMPROVEMENT Bills, are referred to the committee on group F, consisting of General Peel (chairman), Mr. Fenwick, Mr. Mildmay, Sir Matthew W. Ridley, and Mr. Agar-Ellis, who will sit on Wednesday, March 13, at twelve o'clock.

The MIDDLETON IMPROVEMENT, and the TONGE IMPROVEMENT Bills, were referred to the committee on group G, consisting of Mr. Hankey (chairman), Lord Edward Howard, Mr. Woods, Major Parker, and Lord Henry Thynne, who will sit on Wednesday, March 13, at one o'clock.

MARCH 4.

Two petitions were presented against the HIGHWAYS Bill, and 45 against the PAROCHIAL ASSESSMENTS Bill.

PAROCHIAL ASSESSMENTS BILL.

On the order of the day for going into committee on this Bill,

Sir G. C. LEWIS moved that it be referred to a select committee.

Mr. MOFFATT believed the Bill to be so faulty as to be incapable of satisfactory amendment in committee. If the right honourable gentleman (Sir G. G. Lewis) persevered with his motion at that hour (20 minutes after 12 o'clock), he should move an amendment.

Sir J. PAKINGTON thought that the course proposed by the Home Secretary was a moderate one, and that it ought to receive the sanction of the House. (Hear, hear.)

Mr. WILLIAMS said that the objection to the Bill was universal throughout the metropolis.

Mr. CONINGHAM observed that the objections to it were not confined to the metropolis.

Sir M. PETO thought that an opportunity ought to be given to honourable members to state the defects of the measure.

Sir G. C. LEWIS admitted that the provisions of the Bill would not be very convenient to apply to the metropolis, but he had understood that the proposal for referring it to a select committee would meet with the approbation of all parties.

Mr. HOPE said that objections were entertained in the borough which he represented to the application of the Bill to it.

Mr. HENLEY remarked that, so far as he had heard from his county, there was an unmixed dislike to the Bill. (Laughter.)

After a short discussion, the House divided on the question that the Bill be referred to a select committee, when the numbers were—

For the motion	47
Against it.	15
	— 32

The Bill was accordingly ordered to be referred to a select committee.

The LOCAL GOVERNMENT ACT AMENDMENT Bill was read a second time.

Petitions were presented against the BIRMINGHAM IMPROVEMENT Bill, from the Warwick and Birmingham Canal Company, and the Worcester and Birmingham Canal Company; against the BOLTON CORPORATION Bill, from the ratepayers and gas consumers of Bolton, Samuel Scowcroft and others, the overseers of the poor of Great Bolton, George Piggot, and George Piggot and others; and against the STOCKPORT DISTRICT WATER Bill, from the Manchester Sheffield, and Lincolnshire Railway Company, and the Manchester and Buxton turnpike road trustees.

MARCH 5.

Three petitions were presented against the HIGHWAYS Bill; 34 against the PAROCHIAL ASSESSMENTS Bill; against the BIRMINGHAM IMPROVEMENT Bill, from the London and North-Western Railway Company, the Great Western Railway Company, the Birmingham Canal Navigation Company, Joseph Allday (against clauses), and Charles James Phillips and others (against clauses); against the BOLTON CORPORATION Bill, from Peter Ormrod and others; against the DARLINGTON LOCAL BOARD OF HEALTH Bill, from the Duke of Cleveland; against the HUDDERSFIELD GAS Bill, from the inhabitants of Marsh; against the STOCKPORT DISTRICT WATER Bill, from the corporation of Stockport, Charles Bostock and John Bostock, and John Sidebotham; and against the THAMES EMBANKMENT Bill, from the London, Chatham, and Dover Railway Company.

MARCH 6.

One petition was presented against the HIGHWAYS Bill; 15 against the PAROCHIAL ASSESSMENTS Bill; against the BIRMINGHAM IMPROVEMENT Bill, from the Earl of Stradbroke and Stephen Clissold, Earl Howe, the governors of King Edward's School, Birmingham, Birmingham Water-Works Company, the butchers of Birmingham, Ebenezer Robins and others, the Birmingham and Staffordshire Gaslight Company, William Inge and others, Lord Calthorpe, the trustees of the Birmingham Blue-Coat Charity School, Henry Morgan, the London and North-Western Railway Company, and the

Midland Railway Company; against the STOCKPORT DISTRICT WATER Bill, from William John Legh, John Fernihough, and William Jowett; and against the THAMES EMBANKMENT Bill, from the Metropolitan Board of Works.

The STANDING ORDERS COMMITTEE reported that the Standing Orders ought *not* to be dispensed with in respect of the ALDERSHOT GAS Bill, and the HASTINGS WESTERN WATER Bill.

The STANDING ORDERS COMMITTEE also reported that the petition for dispensing with Standing Order 105, in the case of Earl Fitzwilliam against the DUBLIN CORPORATION WATER Bill, ought to be dispensed with.

MARCH 7.

Twelve petitions were presented against the HIGHWAYS Bill, and 25 against the PAROCHIAL ASSESSMENTS Bill.

MARCH 8.

Fifteen petitions were presented against the PAROCHIAL ASSESSMENTS Bill.

A BILL TO AMEND THE LOCAL GOVERNMENT ACT.

[*Prepared and brought in by Mr.* CLIVE *and Sir* GEORGE LEWIS.]

Whereas it is expedient to amend "The Local Government Act, 1858:' be it therefore enacted by the Queen's most Excellent Majesty, by and with the advice and conseut of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same, as follows:

1. Ratepayers or owners making a requisition for the summoning of meetings for the purpose of deciding as to the adoption of "The Local Government Act, 1858," shall, if required, give security in a bond, with two sufficient sureties, for repayment to the summoning officer, in the event of the Act not being adopted, of the costs incurred in relation to such meetings or polls taken in pursuance of any demand made at such meetings, the amount of the security to be given by such sureties, and their sufficiency, and the amount of such costs, to be settled by agreement between the summoning officer and such ratepayers or owners, or in the event of disagreement between them by any justice of the peace acting in and for the place in which it is proposed that the said Act shall be adopted.

2. Local boards may exercise the powers given by the forty-fifth section of "the Public Health Act, 1848," also without their district, for the purpose of outfall or distribution of Sewage, upon making due compensation, to be settled in the manner provided in the one hundred and forty-fourth section of "The Public Health Act, 1848."

3. Provided, that no sewer or other work shall be constructed or extended, under the enactment lastly hereinbefore contained, unless *three* months at the least before the commencement of such work notice of the intended work, describing the nature thereof, and stating the intended termini thereof, and the names of the parishes, townships, and places, and the turnpike roads and streets or places laid out or intended for streets, and other lands, if any, through, across, or under which the work is to be made, and naming a place where a plan of the intended work is open for inspection at all reasonable hours, shall be given by advertisement in one or more of the newspapers usually circulated in the place where the work is to be made, and a written or printed copy of such notice shall be served in manner directed by "The Public Health Act (1848)" on the owners or reputed owners, lessees or reputed lessees, and occupiers of the said lands, and on the overseers of such parishes, townships, or places, and the trustees, surveyors of highways, or others, having the care of such roads or streets.

4. In case any of such owners, lessees, or occupiers, or such overseers' trustees, surveyors, or others as aforesaid, or any other owner, lessee, or occupier who would be affected by the proposed work, object to such work, and serve notice in writing of such objection on the local board at any time within the said *three* months, the proposed work shall not be made or commenced without the sanction of one of Her Majesty's principal Secretaries of State, after such inquiry and report as hereinafter mentioned (unless such objection be withdrawn).

5. It shall be lawful for the Secretary of State, upon application of any local board, to appoint an inspector to make inquiry on the spot into the propriety of any such work as aforesaid, and into the objections thereto, and to hold one or more meeting or meetings for the purpose of hearing all persons desirous of being heard before him on the subject of such inquiry, and to report to such Secretary of State upon the matters with respect to which such inquiry was directed.

6. The subdivision numbered (4.) in the thirty-seventh section of the said Local Government Act, 1858, shall be and the same is hereby repealed; and in lieu thereof be it enacted as follows:

(1.) Where part of a township, or place not compromised within any district in which the said "Local Government Act (1858) is in force, and which part is hereinafter referred to as the excluded part," was, before the said Act came into force in such district, liable to contribute to the highway-rates for such township or place, such excluded part shall for all purposes connected with the repairs of highways and the payment of highway-rates, be considered to be and be treated as if forming part of such district:

(2.) It shall be lawful for a meeting of ratepayers of the excluded part (to be convened and conducted in the manner prescribed by the thirteenth section of the said Local Government Act (1858), with respect to districts, not being corporate boroughs or towns, under the jurisdiction of improvement commissioners), to decide that such excluded part shall be formed into a separate highway district, and thereupon the excluded part shall for all purposes connected with highways, surveyors of highways, and highway-rates, be considered and treated as a township maintaining its own highways:

(3.) The requisition for holding such meeting as last mentioned shall, in any excluded part where the said Local Government Act (1858) has been in force before the passing of this Act, be presented within *six* calendar months after the passing of this Act, and in all other cases within *six* calendar months after the adoption of the said Local Government Act (1858); but nothing in this section before contained shall apply to districts constituted under the Public Health Act (1848), including a part only of any parish, township, or place which before the constitution of such district maintained its own highways.

7. Where, in any district, special district rates, under the powers of "The Public Health Act, 1848," are levied over the same area as general district rates, the local board may, with consent of all persons having advanced money on the security of such special district rates, make and levy such special district rates as part, and under the name, of general district rates.

8. Where any local board of health have incurred expenses in or about any works of a permanent nature, and have made and levied a special district rate upon or in respect of the premises situate in part of their district, and have borrowed and taken up at interest on the credit of the said special district rate any sums of money necessary for defraying such expenses, it shall be lawful for such local board, with the sanction of one of Her Majesty's principal Secretaries of State, and with the consent of all persons having advanced money on the security of the said special district-rate, and with the consent of the owners and ratepayers of the district, to be expressed by resolution in the manner herein provided with respect to resolutions for the adoption of the said Local Government Act, to pay off and discharge the sums so borrowed and taken up at interest on the credit of the said special district-rate, or such part thereof as shall then remain due, and to re-borrow and take up at interest on the credit of the general district-rates of the said local board any sums of money which shall have been so paid off and discharged, and for the purpose of securing the repayment of any sums so borrowed, together with interest thereon, the local board may mortgage the said general district-rates to the persons by or on behalf of whom such sums are advanced, subject to the regulations prescribed by the fifty-seventh section of the Local Government Act, 1858.

9. In all cases in which prior to the passing of "The Local Government Act" all or any of the powers or provisions of "The Public Health Act, 1848," relative to the borrowing of money or the mortgaging of rates, are repeated in any local Act of Parliament, or in which it is declared in and by such local Act that the same shall be read and construed as if all or any of such powers and provisions had been repeated therein, so as to confer thereunder upon any such local board of health or board of improvement commissioners powers corresponding with all or any of the borrowing or mortgaging powers contained in "The Public Health Act, 1848," and where the sanction, consent, direction or approval of the General Board of Health is rendered requisite in or by any such local Act to the due exercise of any of the powers vested thereby in any local board of health or board of improvement commissioners, such powers or any of them shall and may be henceforth exercised with and under the sanction, consent, direction, and approval of one of Her Majesty's principal Secretaries of State, in lieu of the sanction, consent, direction, and approval of the General Board of Health aforesaid, and not otherwise.

10. In the construction of "The Lands Clauses Consolidation Act, 1845," for the purposes of any provisional order under "The Local Government Act, 1858, conferring powers for the taking of land otherwise than by agreement, the term "special Act" shall mean the Act confirming such order, and "the date of the passing of the special Act" shall mean the date of the passing of the Act confirming such order.

11. The powers granted by the seventy-eighth section of "The Local Government Act, 1858," may be exercised in any case where any local board or board of improvement commissioners exercising the borrowing powers of "The Public Health Act, 1848," or "The Local Government Act, 1858," or of any local Act, has contributed to, purchased, or executed any permanent works, or proposes to contribute to, purchase, or execute such works, at a cost exceeding or estimated to exceed one year's assessable value of the premises assessable within the district in respect of which the money for such works may be borrowed.

12. All local boards of health constituted burial boards may from time to time repair and uphold the fences surrounding any burial-ground which shall have been discontinued as such within their jurisdiction, or take down such fences and substitute others in lieu thereof, and shall from time to time take the necessary steps for preventing the desecration of such burial-grounds, and placing them in a proper sanitary condition; and where such burial-boards are a local board of health, they may from time to time pass bye-laws for the preservation and regulation of all burial-grounds within their limits, and the expense of carrying this section into execution may be defrayed out of any rates authorized to be levied by any local board constituted a burial board.

13. The expenses stated in the sixty-second section of "The Local Government Act, 1858," to be a charge on the premises, with interest after the rate of *five* per centum per annum, may, by order of the local board of health, be declared payable by annual instalments, with interest after the rate aforesaid, during a period not exceeding *thirty* years, until the whole amount be paid; and any such instalments and interest, or any part thereof, may be recovered from the owner or occupier of such premises in the same manner as general district rates, and may be deducted from the rent of such premises in the same proportions as are allowed in the case of private improvement rates under the ninety-first section of "The Public Health Act, 1848."

14. This Act shall be deemed to be incorporated with the Local Government Act, 1858, and shall be read as if this Act and the said Local Government Act were one Act.

15. In citing this Act, it shall be sufficient to use the words and figures "Local Government Act (1858) Amendment Act, 1860."

Legal Intelligence.

GREENWICH COUNTY COURT.

(*Before* J. PITT TAYLOR, *Esq.*, *Judge.*)

WEDNESDAY, FEB. 27.

SURREY GAS CONSUMERS COMPANY *v.* BAKEWELL.

A claim of £3. 17*s.* 3*d.*, for gas supplied by the above company to the defendant, who had paid £3. 1*s.* into court.

Defendant said he had tendered to the company's agent the amount paid into court. He complained of an overcharge. His gas for the quarter ending March 21st last was £2. 2*s.*, while the charge for the previous quarter, that ending December 21, was only £1. 5*s.* 9*d.* These quarters being similar as to the length of the nights, he naturally expected the charge would be alike in both cases. In the month of January, he ceased to occupy a room lighted by gas, the room used instead being lighted by oil. The charge ought, therefore, to have been less for that quarter than for the previous one, and not greater. The reason why the room was disused was because he employed a servant less in 1860 than in 1859.

His HONOUR remarked that possibly the servant who left was the one who turned on the gas. After she left, it might have been turned on by a less careful person, and that would make a great difference in the quantity consumed.

The *defendant* stated that only one burner was under the control of the servants, and that was the burner in the room disused since January. He was disputing with the company about the matter till August last, when he

told them the charge must be remitted or the gas cut off. The company adopted the latter alternative.

Mr. NOTTIDGE, chief clerk to the company, pointed out that the charge for the March quarter of the previous year was £1. 11s. 3d. There were only twelve weeks in that quarter, but there were thirteen weeks in the quarter about which there was a dispute. Consequently, to the £1. 11s. 3d. must be added 2s. 7d. (one-twelfth of that amount), to enable the two quarters to be fairly compared together. The gas for the corresponding thirteen weeks of the previous year, therefore, amounted to £1. 13s. 8d.

The *defendant* replied that, during the quarter, he burnt two lights in the dining-room every night, but during the quarter ending March last, not only was one burner less used, as he had stated, but one light only was burnt in the dining-room. To prevent litigation, he had tendered to the company the same amount as that paid for the corresponding quarter in the previous year.

His HONOUR said the law looked upon the index of the meter as recorded in the company's books as *primâ facie* evidence of the quantity of gas consumed. It was for the defendant to show that the index was faulty, and this not having been done, judgment must be given for the plaintiffs.

GUILDHALL POLICE COURT.

SATURDAY, MARCH 9.

(*Before Alderman* HALE.)

THE CHARTERED GAS COMPANY AND THE MARINE-STORE DEALER.

Benjamin Taylor, a marine-store dealer of 56, Lower Whitecross Street, was summoned for having unlawfully in his possession a three-light gas-meter, the property of the Chartered Gas Company.

Mr. HUMPHREYS jun., for the prosecution, stated that the gas-meter in question was fixed in the house, 14, Brackley Street, then occupied by Mr. Cole, and when about to take the state of the meter, in December, the house was found closed, and it was ultimately discovered that the meter had been removed. The missing meter was recently found at the defendant's shop, where it was exposed for sale, and, on being interrogated, he said he had had the meter in his possession for the last two years; but the evidence would disprove that assertion, as the company's servants were enabled to identify certain work, in the shape of repairs, which they did to it as recently as the month of July or August last; and, although the plates bearing the number, the maker's name, and the statement that the meter was the property of the company, had been taken off, they would be able to swear to it as one of the company's meters. The whole of these facts would be proved in evidence; and as the company never, under any circumstances, parted with their meters, it was quite clear that the defendant could not have had their meter two years ago in his possession.

Several witnesses were then called by Mr. Humphreys, whose evidence entirely corroborated the above statement.

Mr. BEARD, for the defence, said he had a perfect answer to this complaint. The defendant was a highly respectable tradesman, and had carried on business in Lower Whitecross Street for the last seven years, which, in itself, ought to be sufficient to establish his innocence of this charge; but, independently of his respectability, he was prepared to prove that he bought the meter, two years ago, at a salvage sale, at York Terrace, Barnsbury, where a house had been completely gutted by fire.

Several witnesses deposed to these facts, but they would not venture to swear positively that the meter produced was the same which was sold with the salvage from the fire.

Mr. HUMPHREYS said he did not expect they would, as the index-glass and the japanned case of the meter did not bear the slightest traces of having been in a fire. It was also important the court should know that the defendant had one of the company's meters, of the same make, in use in his own business, and he must, therefore, have known to whom the meter belonged.

Alderman HALE said the evidence satisfied him that the meter was the property of the Chartered Gas Company, notwithstanding the removal of the plates; and, although he did not mean to say that marine-store dealers were dishonest, he thought they bought such odd things that, when they were found doing wrong, they ought to be very severely dealt with, as a caution to the rest of their fraternity against purchasing gas-meters.

Mr. BEARD said his client was a purchaser of salvages, and not a marine-store dealer.

Alderman HALE then fined the defendant 5s. and costs, and further ordered the meter to be given up to the company.

Miscellaneous News.

RATCLIFF GASLIGHT AND COKE COMPANY.

The Half-Yearly General Meeting of the Shareholders of this Company was held at the London Tavern, on Thursday, the 28th ult.—J. G. HAMMACK, Esq., in the chair.

The advertisement convening the meeting having been read, and the seal of the company affixed to the share register,

The SECRETARY (Mr. H. J. Baddeley) read the following report and abstract of the trade account:—

The directors have much pleasure in submitting to the proprietors a report of their proceedings, together with the balance-sheet and trade account, duly audited, for the past half year.

The reconstruction of the gasholder, specially referred to at the last meeting, was undertaken and completed by Messrs. Hanna, Donald, and Wilson, the contractors, with all possible despatch; and, since the month of November last, the company's district has been continuously supplied with gas from that holder.

The rebuilding of such portion of the premises as dilapidations had rendered necessary will be shortly finished, and the offices will then be better adapted for the proper conduct of business.

The Bill for "Better Regulating the Supply of Gas to the Metropolis" having become law, your executive have devoted much time and careful attention to the Act of Parliament, and have already given effect to some of its provisions.

The shareholders will be pleased to hear that their engineer has availed himself of an opportunity which presented itself of making good, at a small cost, the pipe that formerly supplied the district between the Wapping and Hermitage Bridges, as it will be in their remembrance that the company was compelled, at a heavy outlay, to carry a 15-inch wrought-iron oval main across the Wapping entrance of the London Docks, because the pipe now repaired was inaccessible to the company's workmen. Your engineer has also been engaged in laying down, along Royal Mint Street, Cable Street, and New Road, 1845 yards of 8-inch main in lieu of 3 and 4-inch pipes, and about 600 yards of 12-inch main in the place of 4, 6, and 8-inch pipes, from the gasholder station in Johnson Street to St. George Street, so that the whole district can now be supplied with gas efficiently from either station. The plant is consequently increased in value to the extent of the difference in the cost between the new pipes laid down and the old pipes taken up.

The vacant office of secretary to your company has been filled by the appointment of Mr. Henry John Baddeley, at a salary of £400 per annum.

The directors regret they have on this occasion to announce the resignation by John Ebenezer Bromley, Esq., of his seat in the direction, after an association of many years in the management of your affairs, and you are now called upon to elect a duly qualified shareholder to fill the vacancy thereby created.

Notwithstanding the parliamentary expenses necessarily incurred in protecting your interests, the outlay consequent upon the repairs above mentioned, and other circumstances affecting the operations of this company during the past six months, the directors are gratified in being able to recommend the declaration of a dividend for the half year ending the 31st December last, upon the paid-up capital of the company, after the rate of £5 per cent. per annum, and a bonus of 3s. per share (free of income-tax), payable in one warrant, on the 1st day of March next.

The retiring directors, John George Hammack and John Sander, Esqs., and the retiring auditor, John Poulton, Esq., being eligible for re-election, offer themselves accordingly.

Dr. *Trade Account for the Six Months ending Dec.* 31, 1860. *Cr.*

To coals used			£7,331	6	9	By rental for light	£13,470 2 11
Tradesmen's bills, for materials supplied, and other charges			1,493	10	5	Coke and breeze sold	2,833 3 8
Retorts			53	18	0	Tar sold	552 17 1
Rent, rates, and taxes			459	7	6	Liquor sold	59 10 0
Directors			275	0	0		
Auditors			10	0	0		
Salaries			610	1	0		
Wages			2,396	8	0		
Parliamentary expenses—							
Metropolis Gas Bill, 1860			240	0	0		
Bad debts and allowances			305	19	1		
Interest on loans			387	18	3		
Net profit			3,052	4	8		
			£16,615	13	8		£16,615 13 8

The CHAIRMAN moved—"That the report and accounts now read be received, adopted, and entered upon the minutes." He observed that, on the last occasion of their meeting together, he had to condole with the shareholders upon the loss the company had sustained through the death of their late secretary (Mr. John Gill), and to lament the consequences which had arisen out of an accident to one of their gasholders; but he now met them under brighter auspices, and had to congratulate them upon the satisfactory report that day presented. He adverted to the prompt diligence shown by Messrs. Hanna, Donald, and Wilson, of Paisley, the contractors, in repairing the damage occasioned by the late accident, and the spirit of liberality with which they brought to a happy completion the work, which must have been attended with much expense and anxiety to themselves. He feelingly alluded to the retirement of Mr. Bromley from the direction, and, after expressing a hope that the operations of the past six months would be as satisfactory to the shareholders as they were to the board, stated his willingness to answer any questions they might wish to ask before putting the motion for the adoption of the report.

Mr. FOULGER seconded the motion, which was put and carried unanimously.

Mr. POULTON then moved—"That a dividend for the half year ending the 31st December last, upon the paid-up capital of the company, be now declared, after the rate of £5 per cent. per annum, and a bonus of 3s. per share (free of income-tax), payable in one warrant, on the 1st day of March next."

Mr. O. P. JOHNSON seconded the motion, which was carried *nem. dis.*

Mr. KELDAY, in rising to move the re-election of the chairman (one of the directors retiring by rotation), observed that he had had the pleasure of Mr. Hammack's acquaintance for many years; and it always occurred to him, on these occasions, that the best mode of testifying their regard and satisfaction at the manner the chairman and his colleagues had presided over their affairs was by reinstating them in the office which the Act of Parliament required them periodically to vacate. He therefore moved—"That John George Hammack, Esq., be re-elected a director of this company."

Mr. NORTON seconded the motion, which was carried unanimously.

John Sander, Esq., was also re-elected a director, upon the motion of Mr. HENRY BADDELEY, seconded by Mr. GOODHART.

Mr. TAYLOR moved—"That Joseph Henry Goodhart, Esq., be elected a director of this company, in the place of John Ebenezer Bromley, Esq., resigned." He stated that Mr. Goodhart had long been connected in business with the district supplied by the company, and had much pleasure in proposing him as a director; regretting, at the same time, the necessity which had occasioned the vacancy.

The motion was seconded by Mr. WALMISLEY, and carried unanimously.

The CHAIRMAN and Mr. GOODHART returned thanks.

Mr. JOHNSON moved, and Mr. WOOD seconded, the re-election of Mr. Poulton as auditor, which was carried, and

Mr. POULTON returned thanks.

Special votes of thanks were cordially passed to the board of directors, the auditors, and the secretary, which were duly acknowledged.

The proceedings were terminated by a vote of thanks to the chairman.

COUNTY AND GENERAL GAS CONSUMERS COMPANY (LIMITED).

The Fourth Ordinary Annual Meeting of this Company was held at the office, King William Street, City, on Thursday, the 28th ult.—E. H. J. CRAUFURD, Esq., M.P., in the chair.

The SECRETARY (Mr. Parker) read the following report. The statement of accounts appended was taken as read:—

The directors have great satisfaction in submitting the balance-sheet and accounts for the half-year ending on the 31st of December, 1860, and beg to congratulate the shareholders on the continued and rapid improvement manifested in the operations of the company.

The capital account shows an increase of £6648. 14s. 7d. About two-thirds of that amount is due to the completion of the purchase and the necessary repairs and alterations at the Ware Works. The remainder has been applied in the construction of new gasholder tanks at Lea Bridge and at Pater, and in extensions in those and the other districts of the company.

After providing for Midsummer dividend and interest on loans and all other outgoings for the past half year, a total profit has been realized of £841. 14s. 9d. Out of this sum, the directors have added £156. 13s. 1d. to the reserve-fund, and have written off £38. 12s. 9d. from preliminary expenses, £20 from law charges, and £12. 9s. as depreciation of furniture, leaving a balance of £613. 19s. 11d., sufficient to pay a dividend for the half year ending 31st December, 1860, at the rate of 6 per cent. per annum, and to carry forward a surplus unappropriated of £138. 7s. 7d. And the directors recommend the declaration of a dividend accordingly, to be made payable on and after the 31st of March next.

The following members of the board, viz.:—Henry W. Hay, Esq., and A. E. Stephenson, Esq., retire from office by rotation; but, being eligible, beg to offer themselves to the shareholders for re-election.

Messrs. Camroux and Thomas, the auditors, having completed the term for which they were appointed, beg likewise to offer themselves for re-appointment.

Dr. *Balance-Sheet to December 31, 1860.* *Cr.*

CAPITAL AND LIABILITIES.

Capital—		
Received from sundry shareholders, viz.:—		
£5 per share on 1572 ordinary shares	£8,324 0 0	
3 „ 10 „ „		
2 „ 155 „ „		
1 „ 124 „ „		
5 „ 1474 preference shares	8,163 0 0	
2 „ 267 „ „		
1 „ 259 „ „		
Total shares on register 3861		£16,487 0 0
Debts and liabilities—		
Debentures and loans	£4,530 6 2	
Mortgage on sundry works	4,000 0 0	
Balance of purchase-money of Ware Works, as per contract, to be paid off by annual instalments over a period of six years	3,700 0 0	
Acceptances for goods supplied	804 3 8	
Tradesmen and sundries	1777 4 11	
Unclaimed dividends	86 18 11	
		14,898 13 8
Reserve-fund		43 6 11
Profit and loss		841 14 9
		£32,270 15 4

PROPERTY AND ASSETS.

Property held by the company—		
Leasehold buildings and plant at Northfleet, Pater, Pembroke, and Lea Bridge	£14,396 8 6	
Freehold buildings and plant at Walton, Chertsey, and Ware	12,406 2 8	
		£26,802 11 2
Stock in trade at sundry works	£1,103 9 1	
Office furniture and fittings	102 9 0	
		1,205 18 1
Items of expenditure to be liquidated out of revenue by instalments, under Art. No. 71, viz.:—		
Preliminary expenses	£ 738 12 9	
Law charges	232 2 8	
		970 15 5
Debts due to the company—		
Bills receivable, and sundries	£ 248 9 10	
Gas and meter rental, &c., in course of collection by district agents	2,845 18 4	
		3,094 8 2
Cash—		
Cash at bankers	£ 196 8 1	
Petty cash—balance in hand	0 14 5	
		197 2 6
		£32,270 15 4

Dr. *Profit and Loss Account.* *Cr.*

To Dividend declared at meeting held on August 30, 1860		£ 215 7 6
Coals carbonized	£1,121 14 10	
Lime and purifying materials	60 6 7	
Wages and labour	406 3 9	
Retorts	54 19 0	
Rent of sundry works	136 6 8	
Local rates and taxes	78 8 6	
Commission and agency fees	70 11 1	
Miscellaneous and petty charges at works	97 9 10	
		2,026 0 3
Office expenses, including auditors' fees, rent of offices, salaries, and petty expenses	£ 155 10 7	
Stationery and advertising	42 7 3	
		197 17 10
Interest account		358 12 2
		£2,797 17 9
Balance—profit		841 14 9
		£3,639 12 6

By Balance, from June 30, 1860		£ 215 7 6
Gas and meter rental	£2,985 16 10	
Products and sundries	438 8 2	
		3,424 5 0
		£3,639 12 6

Appropriation of Dividend.

Reserve-fund	£ 156 13 1	
Preliminary expenses	38 12 9	
Law charges	20 0 0	
Furniture	12 9 0	
		£227 14 10
Dividend at 6 per cent. per annum		475 12 4
		£703 7 2
Surplus to profit and loss—new account		138 7 7
		£841 14 9

The CHAIRMAN: I have now to ask the meeting to accept and adopt the report which has been put before them. A comparison of this report with the one presented on the last occasion will show that as a company we are progressing as we have done before, only during the last half year we have taken rather a longer step in advance than during the previous period. I hope and believe that this onward progress will be maintained. Our increase during the past half year is much larger than we could expect, and that is due to the fact that we have new works added to those we had before. I am happy, however, to say that, deducting the increase which is due to the Ware Works, there is an actual addition to our returns of something like £400. The Ware Works we have only had for one half year, and though it is the best half of the year for a gas company, there is, as you know, always a certain amount of drawback in connexion with the possession of new works which tell against us on the other hand, and until we have had them in operation for twelve months these things will prevent our arriving at a proper estimate of their true value and worth to us. Still the first half year's working shows that the purchase we have made will be an exceedingly profitable one to us. The gas rental is considerably larger than that which formed the basis upon which we purchased those works, and therefore we may congratulate ourselves in having obtained them. We have detailed in the report the increase which has been made upon the capital account; and I think you will say that the profits fully justify that increase. We have also on this occasion thought it better to bring out more prominently to the public the way in which the profit has been made, and the mode in which it is distributed. Heretofore, we distributed the profits obtained, and having written off the amount carried to the reserve-fund, left apparently only a small balance sufficient for paying a dividend. But many people do not go into these matters, and they prefer to see what we have made. We have therefore drawn up the account showing the total profit after paying interest, amounting to £841. 14s. 9d., *i.e.*, after paying £358. 12s. 2d. for interest upon money borrowed, which is in the nature of dividend upon capital invested in the undertaking. I think we are justified in looking with every confidence for the approval of the shareholders as to the mode in which the business has been carried on, and that this report will receive their unanimous assent. There is one other matter in which you will perceive that we have made an alteration. Questions have been put to us at different times as to why we have treated preliminary expenses as an asset. It is not really an asset; it is an advance from capital to revenue, repayable out of revenue in the future. But, although it is a charge we are entitled to make, we have thought it better, to obviate any difficulty, to put it under the head of items of expenditure, which have to be liquidated under article 71, Table B. If there is any point in the balance-sheet on which a doubt as to its correctness should be entertained, we are anxious to meet it; and on this ground we have made the alteration I speak of, and which, I think, is a decided improvement in the form of our accounts.

Mr. WILLIAMS: I beg to move—"That the directors report and balance-sheet with the auditors' report, be adopted and printed for circulation." I think we must all feel much gratified at the increase in our rental, and also the increase in our dividend. I only hope we shall go on increasing from year to year until we reach 10 per cent., which I believe is the maximum dividend we are allowed to receive.

Mr. JONES seconded the resolution.

Mr. H. P. STEPHENSON: With respect to what fell from the chair as to "preliminary expenses," I should like to say that it is in fact an asset, because it represents the goodwill of our business, and therefore, the directors are perfectly justified in treating it as such in the balance-sheet.

The CHAIRMAN: I am glad Mr. Stephenson has pointed that out. It is a very proper observation, only we are bound to see what we are justified in doing under the Act. I merely referred to it for the purpose of explaining, why we have made an alteration in the form of the accounts.

The resolution was then put and carried.

On the motion of Mr. MORRISON, seconded by Mr. JOHN AIRD, jun., the dividend recommended in the directors report, was unanimously adopted.

The CHAIRMAN: I can only say that the directors, through me, express the pleasure they feel in being able to increase the dividend to 6 per cent. Mr. Williams has said, that he hopes it will go on increasing. So do I, but still I think for a young company we have made very satisfactory progress already, and it will not be well to raise our expectations too high, and discount the future. We feel that we are fully justified in recommending what we have, because we have made our reserve-fund up to £200, and have written off rather liberally on such things as we ought to write off.

The retiring directors, Messrs. H. W. Hay, and A. E. Stephenson, were then re-elected.

On the motion for the re-election of the auditors,

Mr. WILLIAMS said, he thought the company ought to elect one, if not both the auditors from the body of shareholders.

Mr. AIRD said when things were going on well, it seemed a pity to make any alteration, and certainly the position of the company was most satisfactory at the present moment.

Mr. WILLIAMS said he would second the motion for the reappointment of the retiring auditors. The remarks he had made were not intended to cast the slightest reflection upon those gentlemen, but merely to elicit the opinion of the meeting upon the policy of electing both the auditors apart from the shareholders.

The CHAIRMAN: My own feeling is, that we are more likely to have a fair and impartial audit from gentlemen who are not shareholders, although if it were the wish of the meeting to elect auditors from amongst themselves, there could not possibly be an objection to it, except that to change them now, would seem to imply that there was some cause for dissatisfaction with the gentlemen who have served you in that office, which I do not think there is.

The motion was then adopted, and the remuneration of the auditors fixed at five guineas each.

Mr. AIRD sen., in accordance with notice, rose to propose a resolution. He said the company had been in existence upwards of four years, and he thought very few gas companies in the metropolis or elsewhere, could boast that so early in their existence, they were able to divide among their proprietors 6 per cent. The prospects of this company were also very cheering, and he felt no doubt in his mind, that if this undertaking had originated a few years earlier than it did, it would by this time have attained to considerable importance. Hitherto the directors, who had laboured very assiduously in promoting the interests of the company, and who had succeeded in placing it in so good and promising a position, had received nothing for their services. But the time had now come when some small recognition of their labours should be made, and he intended to propose that the sum of £500 be voted by the meeting as a remuneration for their past services,

and to that proposition he was sure there would not be a dissentient voice. Having spoken in high terms of the untiring services rendered by Mr. Stephenson the engineer of the company, he concluded by proposing the resolution of which he had given notice.

Mr. MORRISON seconded the motion, agreeing in every word that had been said as to the services rendered by the board.

The motion having been unanimously adopted,

The CHAIRMAN acknowledged the vote. He said the directors had always felt the fullest confidence in the undertaking, and they had cheerfully laboured to develope it, knowing that while thus promoting the interests of the shareholders at large they were serving their own interests as well. From the commencement they were sure the concern was a sound one, and needed only a little patience to bring it into a paying condition. Their expectations had been more than realized, and they were gratified to find to day that the exertions they had made to secure the present position of the company were so kindly appreciated by the shareholders, who had adopted a very substantial form in which to express their good feeling to the board. He cordially agreed with the observations of the mover relative to the engineer, whose whole soul was in the company, and to whose energy was to be attributed very largely its progress and success. Mr. Stephenson's attention had been indefatigable, and those only who occupied the position the directors did, could properly appreciate the value of his services. He believed that in no case had there been an error in the purchases which their engineer had made, or in the terms he had recommended the board to make. Each of their works had given large extensions. At Pembroke Dock they had double the number of consumers now to what they had when they took the works; and there had been a comparatively equal increase at the other stations, showing that all the purchases had been made with due care and a thorough practical knowledge of the business. It was gratifying to him (the chairman) to sit at a board with gentlemen who were thoroughly acquainted with the details of the various matters which came before them; and he cordially hoped that the good feeling which had always existed among the directors, a matter so essential to the success of any undertaking, would still continue, and that they should enjoy in the future as much of the confidence of the proprietors as they now possessed. For himself and his colleagues he returned sincere thanks for the liberal vote they had just adopted.

Mr. MORRISON then moved, and Mr. WILLIAMS seconded—"That the remuneration of the board for the present be fixed at £100 a year.

Mr. PAYNE thought the company were in a position to vote the directors £200 a year.

Mr. CHRISTIE as one of the directors, assured the honourable proprietor, that at present the board would be fully satisfied with the amount first proposed, leaving the matter in the hands of the shareholders to increase it at any future time, when they felt that their increased prosperity warranted it.

The CHAIRMAN said he fully endorsed the observation of Mr. Christie, and though he did not say the company could not afford the larger sum now, the directors would prefer to keep on the right side of the hedge.

The motion was then adopted, and the Chairman again expressed the thanks of the board to the proprietors.

A vote of thanks was then given to the officers, special mention being made by the chairman and Mr. Aird, of the zeal and ability displayed by the Secretary.

Mr. PARKER acknowledged the vote, and assured the meeting of the continuance of his exertions to promote the interests of the company.

The proceedings closed with the usual vote of thanks to the chair.

WOLVERHAMPTON GAS COMPANY.

The Eighteenth Half-Yearly Meeting of this Company was held at the Works, Horseley Fields, on the 26th ult.—Mr. Jos. WALKER in the chair.

The attendance of shareholders was much more numerous than usual, owing to its being understood that there was to be some opposition in the election of directors. Among those present were the Mayor, Mr. Jos. Cooper, Mr. Shipton, Mr. Wood, Mr. Cox, Mr. W. Savage, Mr. B. Savage, Mr. Underhill, and other proprietors.

After the advertisement convening the meeting had been read,

Mr. PROUD (the engineer), read the report, as follows:—

Your directors, on this occasion, beg to lay before you their eighteenth half-yearly balance-sheet and general statement of accounts duly certified by your auditor, showing the revenue for the half year ending 31st December, 1860, to be £13,330. 4s. 10d., and the expenditure, £8348. 10s. 2d.; leaving a balance of £4981. 14s. 8d., from which your directors recommend the payment of the usual 5 per cent. dividend, clear of income-tax, amounting to £3358. 8s., payable on and after Wednesday, 6th March: the remaining balance of £1423. 6s. 8d. to be transferred to the reserve-fund.

Agreeably with the hopes expressed in the last half-yearly report, your directors are happy to inform you the very best results have accrued from the various improvements, enlargements, and extensions then mentioned, and they are now enabled to supply every part of the lighted district with an abundant and uniform flow of gas. On this point, your directors are exceedingly careful to give their customers the utmost satisfaction both as regards quantity and quality.

The most pleasing duty of your directors is now to be announced. The profits of the past year convince your directors that they may, from the end of March, reduce the maximum rate of gas from 4s. 2d. to 3s. 9d. per 1000 cubic feet, with a reduction in the charge for public lamps, and still carry forward a sufficient surplus to insure the full dividend of 10 per cent. per annum to the shareholders. They are well assured that it is sound policy to cultivate a good feeling with their customers, and that nothing is better calculated to accomplish this desirable end than to deliver an ample supply on terms such as will equal those of the largest and best conducted gas companies in the kingdom.

On the present occasion, three of your directors retire by rotation, namely, Mr. Walker, Mr. Shipton, and Mr. Wood, who are all eligible for re-election.

Your directors, in conclusion, beg to assure you they will continue to devote their best attention to the interests you have confided to their care.

Mr. HEWLINGS asked what authority the directors had for appropriating £1212. 10s. to "depreciation," as the balance-sheet showed they had done? He was not aware of their having any such power, either under their own Act or the general Act. They were authorized to place a certain per centage of profits to the reserve-fund, out of which they could make up the dividends or provide for any loss arising from explosion or other causes, but the general Act stated that no money should be taken from that fund without the consent and signature of two magistrates having first been obtained. He was an advocate for the capital being maintained intact, and a reserve-fund being kept in existence, but he thought that legally the £1212. 10s. ought to be added to the reserve-fund. They were not authorized to have two funds. He observed that they had a balance of capital of £730. 10s., but he maintained that that sum, as the working capital of a concern like that, was an absurdity. The directors must have some fund—a depreciation-fund, a reserve-fund, or something else—to fall back upon, but they had no right to trench upon a reserve-fund to meet every contingency that might arise. That fund ought to be invested in consols; the directors had no right to use it in working the undertaking. He would ask Mr. Rutter, their solicitor, under what Act the £1212 had been appropriated to depreciation?

Mr. RUTTER said he did not attend in the capacity of solicitor, but as a proprietor.

Mr. JOSEPH COOPER explained that the directors had originated a depreciation-fund, which now amounted to £3000, to meet expenses consequent on the renewing and the repairing of the mains, which wore out very fast. Such a fund was by no means uncommon among gas companies. Whether it were legal or not, the directors of this company had thought such a fund quite necessary for the protection of the property of the shareholders. As to the reserve-fund, it had been reduced by the payment of £2160 in back dividends to £1090. 11s. 7d. The board had but one object in view—namely, to insure dividends to the proprietors, and to reduce the price of gas. With regard to the depreciation-fund, he might say that the board considered it immaterial whether it were allowed to exist, or whether a certain amount of capital were written off. One thing or other, however, must be done, as the company's plant was not worth the money it originally cost, on account of depreciation.

Mr. HEWLINGS said he admitted that something was requisite for maintaining the plant, but contended that the reserve-fund, limited by the Legislature to £5000, was sufficient for its purpose, particularly as the directors had the means of restoring depreciation out of the company's earnings. He considered that the whole of the money set apart for depreciation ought to be added to the reserve-fund, as it was illegal to have two funds.

In reply to a question, Mr. COOPER said the depreciation and the reserve-funds were used as a part of the working capital. He added, that the directors, in the discharge of their duties, had not consulted the interests of one class of shareholders more than those of another. Their object had been to economize their expenditure, to keep the plant in an efficient state, and, as opportunities arose, to promote the interests of their customers by reducing the price of gas. Since 1857, the consumers of gas had paid £3977 less than they would have done if the charge for gas had not been diminished.

After some remarks from Mr. PERRY (warmly approving of the policy of the directors), Mr. J. UNDERHILL, Mr. WOOD, and other proprietors, Mr. HEWLINGS said he had no objection to withdraw his opposition to the passing of the accounts, if the directors would undertake to consider his remarks, with their solicitor, and report the result at the next meeting.

This the directors consented to, and the subject dropped.

The report and statement of accounts were then approved, and a dividend at the rate of 5 per cent. for the half year was declared payable on the 6th of March.

A suggestion of Mr. HEWLINGS, that in future cheques in payment of dividends be drawn in readiness for the meeting, was referred to the directors for consideration.

Mr. SIMPSON moved that Messrs. Joseph Walker, J. Shipton, and T. Wood, be re-elected directors, which was seconded by Mr. RUTTER.

Mr. THOMAS WARD proposed, and Dr. PUDDICOMBE seconded, that Mr. H. H. Hewlings be elected a director.

Mr. HEWLINGS stated at considerable length the reasons which had induced him to come forward as a candidate for the office of director. If he were elected, he hoped he and the directors would work amicably together, as the members of the board had hitherto done.

Mr. COOPER said that, according to a report in the *Wolverhampton Chronicle*, one of Mr. Hewlings first acts, on being elected to a seat in the town council, was to recommend them to erect gas-works, and supply the public wants in that respect themselves.

Mr. HEWLINGS denied that he had ever made such a recommendation.

Mr. COOPER then recited a number of illustrations, showing the advantages that had accrued to the proprietors and the public from the exertions of the directors; and went on to argue that, if the proprietors elected Mr. Hewlings in the place of one of the retiring directors, they would be practically telling the board that they were not satisfied with the way in which they had carried on the concern; and their decision would not tend to promote the interests of the company. In conclusion, Mr. Cooper pointed to the fact that the bad debts of so large a concern had been only £30 in the last half year, as a proof that the directors had properly discharged their duty.

Mr. PERRY said he had come to the meeting unpledged to vote for either party, but as the concern was in a prosperous state under its present management, and as nothing had been said against the directors, he felt that he should not be doing his duty if he voted against the re-election of the retiring directors. Therefore, he should support them, but if at a future time there should be a vacancy, and Mr. Hewlings should come forward, he should be happy to support him.

Mr. HEWLINGS said he had the opinion of two solicitors, that proxies, unless bearing a stamp with the word "proxy" upon it, would not be good in law.

The CHAIRMAN read a letter from the Inland Revenue Board in London, stating that a proxy, bearing a plain sixpenny ordinary stamp, which had been submitted to the authorities, was "*sufficiently stamped, notwithstanding that the stamp did not bear the word 'proxy.'*"

The votes and proxies were then collected, and Messrs. Simpson and Ward, who were appointed scrutineers, after examining them, reported the result of the voting to be as follows:—Mr. Walker, 3162 votes; Mr. Wood, 3129; Mr. Shipton, 3048; Mr. Hewlings, 1896. The three gentlemen first named were therefore re-elected.

Mr. HEWLINGS said he should test the question of legality of the proxies not bearing a real proxy stamp.

Mr. PERRY then reviewed the chief features of the report, which he contended were satisfactory to both shareholders and consumers of gas, said he recollected the price of gas being 12s. 6d. per 1000 cubic feet, and moved a vote of thanks to the directors for their services.

Mr. HEWLINGS seconded the motion which was adopted, and duly acknowledged by the chairman, after which the meeting terminated.

METROPOLITAN GAS SUPPLY.

ST. LUKE'S (CHELSEA) VESTRY.

TUESDAY, FEB. 26.

FINANCE REPORT.

The committee on financial affairs reported that they had met on Thursday, the 21st ult.—Mr. FINCH in the chair. Messrs. Livingston, Blaxdell, Fisher, Hunt, Hall, Fisher, Lawrence, and Breun were also present. The business transacted was, to consider further the claim of Mr. Hughes, consulting engineer, for services rendered in connexion with the litigation with the London Gas Company, relative to the supply of gas to the public lamps, amounting to £172. 17s. 10d., and his letter, which accompanied the same. It was resolved that Mr. Hughes be informed, that the committee are advised that the amount of his claim is very much larger than was anticipated, and that it should not be paid without further inquiry; but that the committee, considering all the circumstances of the case, are prepared to recommend the payment of £150 (without prejudice) in full satisfaction of his claim.

St. Giles (Camberwell) Vestry.

Wednesday, Feb. 27.

TESTING-ROOM.

A letter from Mr. Livesey stated that the South Metropolitan Gas Company had, according to the provisions of the Metropolitan Gas Act, provided a testing-room at No. 8, Hill Street, Peckham.

The Chairman was about to have told the medical officer, if he had been present, that he could visit the room whenever convenient to himself, the company waiving their legal right to require a notice previous to any visit being made.

St. James's (Westminster) Vestry.

Thursday, Feb. 28.

RESIGNATION OF MR. BEAL.

The Chairman, on taking the chair, stated that, at the close of the business on the last occasion, he had received a letter from Mr. Beal, tendering his resignation as a member of the vestry.

Mr. Elam inquired whether Mr. Beal assigned any reason for this step?

The Chairman replied, he did not.

The business was then proceeded with. The special object of the vestry was to rescind a resolution passed on the 5th of December relative to arbitration with gas companies, and to ascertain if the price of £4. 1s. per lamp was a fair offer.

Mr. Harrison said he had been one of the committee on whose recommendation the present meeting had been called, and he would move that the minute of the 5th of December be read, the effect of the minute being that, if the tender of the gas company was not accepted, the matter should be referred to arbitration. Mr. Stray had, on the last occasion, carried the resolution that Mr. Hughes' services be dispensed with, and the necessary consequence of that resolution was, that the committee would feel themselves incompetent to deal with the question of the supply, price, and purity of gas. He regretted that Mr. Beal had resigned, whose assistance would have been most valuable—who not only led the vestry in gas matters, but led the vestry generally. He would move that the minute be rescinded for twelve months, and this would give the vestry sufficient time to consider whether it would be advisable to adopt the principle of arbitration; which, if adopted, he feared would cause an expense to the parish of some hundreds of pounds.

Mr. Stray objected to arbitration. Mr. Hughes' figures sufficiently demonstrated that, showing that the parish would be a loser on the offer of £4s. 1s. of about 22s. per lamp. In the new Gas Act there was a distinct clause which said that the public lamps should not be charged higher than private lamps, but nothing was said about a lower price. He had wanted a protective clause inserted in the bill, but had been assured by Mr. Beal that the companies could not charge a higher price than they did in 1860. But the reverse was the fact, for a higher price had been charged. He regretted that Mr. Beal had resigned, as his explanations would have been very essential. If the parish went to arbitration, he believed the increased yearly cost would be £733 to the parish. Mr. Stray, in the course of his observations, referred to calculations he had made.

The Hon. Frederick Byng said the resolution in question had been come to because the vestry had only Hobson's choice in the matter. He could not sit down without expressing his sincere regret at the loss of Mr. Beal. He would say, however the bill might have failed in its purpose, that Mr. Beal's intentions were honest, and his desire was to benefit the gas consumer. The bill, however, had certainly not answered expectation, and had given well-founded dissatisfaction. He hoped the gas companies would do something to content the consumers; if they did not, the consumers had a remedy by amending the bill next session. (No.) He feared the non-adoption of Mr. Hughes had led to Mr. Beal quitting them. He had certainly opposed Mr. Hughes, because he objected to put the parish to needless expense.

Mr. Geesin said it was better to have to pay a specific sum than a sum that was indefinite. He should therefore support the motion.

Mr. Crane said the arrangement was, that the parish should be lighted by contract—all except 75 lamps, which were to be paid for by meter. This was Mr. Hughes' own proposition, based on facts that were founded on experiment. Mr. Hughes had calculated the rate of consumption per hour, and his calculation was, that at 6s. per 1000 feet, the average cost would be £3. 4s. 7d. per lamp. The offer of the companies was £3. 6s., which was a small advance on Mr. Hughes. It was shown by Mr. Hughes, in the course of his employment by the works committee, that the company's price of £4. 1s. per lamp for lighting the street lamps was made out on the supposition that a lamp burnt at the rate of 2½ cubic feet of cannel gas per hour, which, calculated at 4304, the computed number of hours in the year from sunset to sunrise, and at 6s. per 1000 feet, gives £3. 4s. 7d., added to which is 10s. for lighting, extinguishing, clearing, &c., which makes a total of £3. 19s. 7d. Mr. Hughes, however, stated that 2½ feet per hour as the consumption of a street lamp was an over-estimate; that it had been satisfactorily ascertained that the same did not burn 1¾ feet per hour, which, calculated in the same way, gives £2. 5s. for the year, and, with the 10s. for lighting and extinguishing, makes £3 as proper price, with the gas at 6s. per 1000 feet for the lamps. That the latter view is correct seems pretty certain by the amount approximating so nearly to the companies old price of £3. 1s. 6d., the parish having just worked out a 7 years contract with both the Chartered and Western at that price—viz., £3. 1s. 6d. and at which price, it is presumed, the companies get a fair profit. He was inclined to put faith in the accuracy of Mr. Hughes' last calculation. Mr. Hughes had stated that the best course to adopt to bring the companies to terms was to establish a meter to test the quantity burned by a certain number of lamps. This was the origin of the meter and the 75 lamps set apart from the other lamps. By the dismissal of Mr. Hughes, the plan in question must be given up, and the vestry had no alternative that he could see than to adopt the offer of the gas companies.

Mr. Stray corrected some figures of Mr. Crane, and vindicated the accuracy of his own calculations.

The motion was put and carried.

The next motion was as to employing the gas companies to light the public lamps at £4. 1s. per lamp.

Mr. Stray made a motion to that effect.

Mr. Dyer seconded it.

Mr. Crane had carefully studied figures and made calculations, and the result he had arrived at was that the parish were going to pay about £1 per lamp more than they had formerly paid. His proposition was that 12 lamps should be set apart to be supplied by measurement, and the Gas Act did not permit gas companies to object to this arrangement.

The Chairman said the amendment could not be entertained, as it was not in harmony with the motion.

The Vestry-Clerk explained that the object of the motion was to give an opportunity to watch the effect of the arrangement. It was competent for the vestry to take steps to ascertain if they were fairly dealt with by the companies. If they were dissatisfied, the vestry could then determine what their future course ought to be.

The motion was put and carried.

Plumstead District Board of Works.

Wednesday, March 6.

The Clerk presented a report, stating that the provisions of this Act affected all the gas companies in the Metropolitan area, excepting in some of the outlying districts, and the Woolwich and Eltham Companies were therefore exempt from the provisions of this Act, but although the districts lighted by these companies were exempted from receiving the benefits of this Act, yet they were called upon to pay a portion of the expense. With reference to the appointment of a gas examiner, it was for the board to decide whether one should be appointed for that portion of their district within the limits of the provisions of the Act.

The Rev. W. Acworth remarked that this was another of the iniquities perpetrated upon Plumstead, by calling upon the parish to pay for that for which they did not receive any benefit.

The board proceeded with the next business, without passing any resolution having reference to it.

St. George's, Hanover Square, Vestry.

Thursday, March 7.

The Vestry-Clerk laid before the vestry the offer of the Chartered Gas Company to supply the public lamps at £3. 6s. per lamp.

Mr. Robinson was of opinion that the parish must accept the offer. In fact, they had no remedy.

Dr. Appleton believed the parish had a remedy. They had appointed an inspector, and the question ought to be referred to him to say whether the offer was a fair and proper one.

Mr. Bertolacci was of opinion that the gas inspector ought to be called upon to report to the vestry from time to time the condition and supply of gas.

Sir J. Shelley said it might be as well to inquire whether common gas would not be as advantageous to use as cannel gas.

Mr. Dowden would advise the vestry to hold its hand for the present, until it ascertained the quantity of gas really consumed, by the aid of meters attached to some of the lamps. He believed it would turn out that the parish was paying from £800 to £1000 a year too much.

Mr. Leslie suggested that the offer should be accepted.

After some further discussion, the motion was agreed to.

Westminster District Board of Works.

Friday, March 8.

Mr. Shedlock, in pursuance of notice, rose to ask Mr. Hughes whether the report in the Journal of Gas Lighting, dated Jan. 29, 1861, in reference to the meeting at the Metropolitan Board of Works, on the 18th of January, 1861, was correct? The paragraph referred to stated, that—

Mr. Hughes said that the £220 paid to him by his vestry, had no connexion whatever with the Metropolitan Gas Bill. He had been employed on the distinct requisition and resolution of his vestry in a most laborious case connected with the rating of a public company, which resulted in the assessment of that company being raised from £4600 to £9000, and by which more than £700 a year was put into the pockets of the parish; and he need scarcely say that the vestry paid his charges very cheerfully and readily, the advantages of his labours being so great.

Mr. Edgar Horne objected to the question being asked, and complained of the *agenda* paper being filled up with personal matters which had no connexion with the business of the day.

Mr. Shedlock said there was something more than a mere personal question involved in this matter, and he was prepared to give a good reason for the course he had adopted. Mr. Hughes could not complain of it, for he had himself adopted a similar course at the Metropolitan Board, with reference to something which had fallen from Mr. Leslie in St. George's Vestry.

Mr. Hughes said that was an entirely different matter. He was himself personally implicated in Mr. Leslie's observations, but Mr. Shedlock could not allege that he was at all involved in the remarks now referred to.

Mr. Lowndes objected to Mr. Shedlock asking the question, unless he was prepared to found a motion upon it.

Mr. Shedlock said it was impossible for him to state what he should ultimately do until Mr. Hughes had replied to the question. If Mr. Hughes said the report was not correct, there was an end of the matter.

The Chairman (Mr. Godson) doubted whether the question ought to be put, because the board had no power to require Mr. Hughes to give an answer.

Mr. Thomas Horn said the question was one of considerable public importance, and ought not to be evaded.

Mr. Edgar Horne moved the previous question.

Mr. Shedlock said he had privately informed Mr. Hughes that he intended to make the inquiry of which he had given notice on the *agenda*, and he was surprised that there should be any attempt to burke it.

Mr. Hughes indignantly protested against such language, which was an insult to the board.

The Chairman interposed, and inquired of Mr. Shedlock whether he was prepared with a motion, after hearing any reply Mr. Hughes might make?

Mr. Shedlock said if he had given notice of a motion before hearing what Mr. Hughes might say, it would have been objected that he was doing Mr. Hughes an injustice by assuming that the report was correct without evidence of the fact, and he was far from wishing to take that gentleman or the Board by surprise.

The Chairman said he must rule that no member could be called upon to answer a question which would involve a notice of motion to be brought forward at a future day.

Mr. Thomas Horn thought the question ought not to be smothered in this manner. A statement had gone before the public as part of the speech of one of their members which, as far as the parish was concerned, was not correct. Either Mr. Hughes or the reporter was in error, and it was important, the matter having been referred to in various vestries, that it should be set right. He considered, therefore, that Mr. Shedlock was quite in order in the course he had adopted.

Mr. Shedlock thought Mr. Hughes ought not to object to answer the question, as it was quite in accordance with the precedent he had himself set at the Metropolitan Board.

Mr. Hughes said he had not objected to answer the question.

Mr. Hartley and Mr. Todd urged that the board should proceed to the next business, but

Mr. Mallock submitted that Mr. Hughes ought at once to answer the

question. It was a matter that was before the public already, and he would damage himself if he did not answer.

Mr. HUGHES said he was perfectly ready to do so, but he thought it was only wasting the time of the board to ask or answer questions which had nothing to do with the business before them, and could only be made the subject of observation in the vestry. In reply to Mr. Shedlock, he would state, in general terms, that the report referred to by him appeared to be correct, but there were one or two points that he wished to explain. He had no recollection of saying that "*more than* £700 a year was put into the pockets of the parish," but thought he said "*nearly* £700 &c." He doubted also whether he used the two words "cheerfully and readily;" he thought he said "cheerfully" only, but the sense was the same. Then he did not think he used the last words, "the advantages of his labours being so great," because he did not believe he had sufficient vanity to express himself in such terms. He rather thought the words must have been added by the reporter for the sake of rounding off the sentence.* With these small exceptions, he might say that the report was substantially correct, and he was prepared to support it. He requested Mr. Shedlock to bear in mind that, prior to the resolution of the vestry there spoken of, he had acted in one or two small matters for the parish for which he had refused to receive payment. Since that period, however, he had made inquiries, and found that there were many cases in which members of vestries had been employed in a professional way, and paid for the services thus rendered. The resolution of the vestry which was sent to him just prior to the Chartered Gas case, and which he now read, was to the effect that the vestry regretted that he had refused to accept five guineas, which had been voted to him for some past service, and urgently requested him to continue to give his able assistance to them in all matters relative to the assessments in the parish, without reference to any remarks which had been made in the public prints, the vestry being of opinion that in all these matters he had acted most assiduously. With reference to his remarks at the Metropolitan Board, that his charges had been "cheerfully paid," he would only say that he understood such to be the case, though he was not present in the vestry at the time. If he had made a mistake in the matter, he was sorry for it. He understood there was a large majority for it, and he could only interpret that as a cheerful payment.

Mr. SHEDLOCK said he would give notice of a motion on the subject for the next occasion. He presumed it would be recorded on the minutes that Mr. Hughes answered his question, affirming the correctness of the report.

Mr. HUGHES: I object to anything of the kind.

The CHAIRMAN: You must have reliance upon Mr. Jebb that he will do what is right.

ROYAL INSTITUTION.

FRIDAY, MARCH 8, 1861.

ON SOME PHENOMENA ATTENDING COMBUSTION IN RAREFIED AIR.

By Dr. FRANKLAND, F.R.S., &c.

The results which I shall endeavour to lay before you this evening originated in a series of observations which I undertook when accompanying Dr. Tyndal to the summit of Mont Blanc, in the autumn of 1859. We then took a number of stearine candles with us which had been carefully weighed in Chamouni before the ascent, and burned for the space of an hour. They were subsequently taken to the top of the mountain, and there burned for the space of another hour exactly. They were then carefully weighed, and the difference between the two results indicated, of course, whether the decrease of atmospheric pressure had caused the combustion to go on more rapidly; or whether, on the other hand, rarefaction had the effect of decreasing the rapidity of combustion. We might naturally expect that, inasmuch as at the summit of Mont Blanc we have not much more than one half of the pressure of the air as in a given bulk at the level of the sea, we should meet with some difference in the result of the combustion of the candles. The result of these experiments which led me to the investigation which forms the particular subject of the discourse this evening, are contained in the tables exhibited. You have here the results yielded by six different candles which were burned at Chamouni. The first candle lost 9·2 grammes of stearine; the second, 9·9; the third, 10·4; the fourth, 9·5; the fifth, 9·2; and the sixth, 9·4. The same candles, for they were carefully burned upon the summit of the mount, lost—the first, 8·7 grammes; the second, 9·5; the third, 9·2; the fourth 4·8; the fifth, 9·3; and the sixth 9 grammes of stearine. If we add these results together and take the mean, we find the rate of combustion at Chamouni was 9·6 grammes per hour per candle, and on the summit of the mountain 9·1 grammes. But you will see that one of these six candles—the fourth—yielded abnormal results; there was evidently something the matter with the candle, which caused it to burn a larger quantity of stearine at Chamouni, and a less quantity on the mountain. It would, therefore, only be fair to leave this candle out of the calculation; when we arrive at this average rate—the rate at Chamouni 9·4 and the rate on the summit 9·2 grammes. We can, therefore, assume from these results, that the rate of combustion is entirely unaffected by the pressure of the atmosphere, and that candles burn exactly the same under one circumstance as another.

While making these experiments upon the top of the mountain, I was very forcibly struck with the difference in the character of the flame. The flame of an ordinary stearine candle exhibits generally this phenomena—we have at the lower part of the flame a blue portion which does not, however, rise within an eighth of an inch of the summit of the wick, and at that point the luminous portion of the flame commences. When the same candles were burned on the summit of the mountain, I noticed that this blue portion extended more than the eighth of an inch above the apex of the wick, consequently the candles gave a smaller amount of light. The luminous effect was obviously, to the most casual observer, considerably inferior to the luminosity of the same candle when burned at the base of the mountain.

This led me, on returning to England, to institute a series of experiments upon the subject, and I found that in fact upon burning a candle in air rarefied to the extent at which it is rarefied on the summit of Mont Blanc, and greater degrees of rarefaction, the illuminating power of candles diminished very rapidly, and to a very considerable extent. The experiments were made in the apparatus I have here, and we cannot do better than repeat them. [The apparatus consisted of a glass receiver connected with an air-pump, by which means he was enabled to diminish the pressure to any required degree, provision being made for an ample supply of air of that degree of rarefaction. By an ingenious contrivance, an image of the mercury-guage was thrown on a screen by the electric light, so that all the audience could see the state of exhaustion, and its effect on the candle burning within the receiver.]

I will now call your attention to a very remarkable phenomenon which is perceptible at a short distance only from the candle. When the illuminating power is diminished to the lowest point, a very beautiful effect is produced, which, however, unfortunately cannot be seen at a greater distance than one or two feet from the platform. When the illuminating power of the candle has almost entirely ceased, there suddenly appears around the nucleus of the flame another flame, which had previously been nearly invisible, if indeed it had been visible at all. It is a large flame, extending to the width of from a quarter to half an inch of the cone of the flame, and it is of a beautiful purple tint. It can only be well seen when the slight light of the internal cone of flame is cut off from the eye by holding the finger or a piece of cardboard between the eye and the flame. Then it comes out very beautifully. This coloured flame I have examined by means of its spectrum, and it appears to possess those rays which are permitted to pass by a solution of permanganate of potash, although it contains rather more blue rays than the permanganate. [By means of a prism and the electric light the lecturer showed the kind of flame perceptible around the candle.] It is compounded of rays from the two extremes of the spectrum.

This effect is very curiously connected with some results, which were first observed by Mr. Gassiot, in the transmission of electric sparks through highly rarefied air, or highly rarefied nitrogen gas. He found that, when the vacuum contained even a trace of nitrogen, the colour at once became of this pinkish hue, which I have since observed in the external flame of the candle. I cannot do better than just show you this colour, which perhaps, more nearly resembles the one I have spoken of than anything else. I believe the cause of the colour in both cases is identical, viz., the ignition of nitrogen. The spectrum which I have shown upon the screen, is the spectrum of incandescent nitrogen. In this tube, we have air highly rarefied to one or two-tenths pressure, and you will see that there is here a similar tint, which is due to the same cause, as the light round the cone of the candle flame. This beautiful colour, which is produced by such minute trace of nitrogen, constitutes the most delicate test we have of the presence of that element. I have seen in the tubes which Mr. Gassiot has shown me, that the most minute crevice in the tube, will admit in the course of a few seconds, a sufficient quantity of nitrogen to exhibit this effect, though far too small to affect the pressure of the gas inside.

Now, on commencing these experiments, so as to bring them into a strictly quantantive form, to enable me to assertain with something like precision what is the actual diminution of light which takes place under these circumstances, I soon found that candles were perfectly useless for the purpose, and that when placed under these artificial conditions, notwithstanding the quality of the materials of which they were made, they would gutter and burn with different lengths of wick; so that the results, which occupied me several weeks in obtaining, were altogether unreliable on account of these variations.

I, therefore, at once turned to gas as being by far more manageable and capable of more uniform combustion under these abnormal conditions. We can by means of a gas-meter like this, regulate the supply of gas to any burner, and thus have at our command the exact quantity of combustible matter which shall be consumed in a given time. The light under precisely similar circumstances was measured by a Bunsen's photometer, the screen of which consists of a disc of paper rendered transparent in the greater part of it by means of a solution of spermaceti and turpentine. If this disc be placed between the two sources of light in an otherwise dark room, and you move it until the illumination on both sides is equal, that equality of illumination will be marked by the disappearance of the opaque spot in the centre of the disc, and in that way it is quite possible to ascertain the illuminating power of the flame. Here, for instance, was the standard gas flame, which was rendered quite constant by causing the gas to pass through a governor, so that it would remain altogether for days perfectly uniform. The experimental flame was placed at the opposite side of the instrument, so that, by moving this disc, the point of equality of the two lights was ascertained, and in this way the results were arrived at.

Now, these results were the following:—

First Series.

Pressure of air.	Illuminating power Observed.	Calculated.
29·9.	100·	100·
24·9.	75·0	74·5
19·9.	52·9	49·0
14·6.	20·2	22·0
9·6.	5·4	3·5
6·6.	·9	·8

So that we had diminished from 100 units down to less than 1, *i.e.*, the light emitted by the same amount of gas under diminished pressure was not 1-100th of what it was under ordinary pressure.

In the second series, the observations were taken at every two inches, and I should say that each number is the result of twenty observations upon that variation of pressure.

Second Series.

Pressure of air.	Illuminating power Observed.	Calculated.
30·2.	100·	100·
28·2.	91·4	89·8
26·2.	80·6	79·6
24·2.	73·0	69·4
22·2.	61·4	59·2
20·2.	47·8	49·0
18·2.	37·4	38·8
16·2.	29·4	28·6
14·2.	19·8	18·4
12·2.	12·5	8·2
10·2.	3·6	2·0

Now, the results of these observations show us, if we look at them carefully, that beginning at atmospheric pressure, and with 100 units of light, we decrease almost exactly 5·1 per cent. of the light for each inch of mercurial pressure that we diminish. [The lecturer referred to two diagrams in which the amount of light was represented by horizontal lines, the pressure of the flame at various illuminating powers being marked by diagonal

---

* The paragraph read by Mr. Shedlock consists of the *ipsissima verba* of Mr. Hughes at the Metropolitan Board.—*Reporter of* JOURNAL OF GAS LIGHTING.

lines.] You see, therefore, that if the illuminating power of a flame diminished in the same ratio with the pressure, then the lines would be a true diagonal to the square, and would proceed from one angle direct to the other; but you see from this diagram that the light diminishes in a more rapid ratio than the pressure.

You find, also, another peculiarity, viz.—that when you get down to something like 15 inches of pressure, there is a sudden divergence, showing that the light does not then decrease in so rapid a ratio as at the higher pressures; *i. e.* from 14 inches downwards it is far less rapid than from 30 to 14. Taking, however, the pressures from atmospheric pressure down to 14 inches, we have a series of descending steps, representing, for each diminution of pressure, very nearly 5·1 inches of light. You have, in one of the above tables, the calculated results upon this assumption, and you see how nearly they coincide with the observed particulars in each case.

Now, as the diminution of light by any given diminution of pressure—by, in fact, a comparatively small diminution of pressure—when we are operating, at atmospheric pressures influences the amount of light given by a flame, it becomes of some interest to ascertain by delicate experiments the variations within the ordinary range of the barometer, and these experiments were made exactly in the same way, but with a water pressure-gauge, instead of a mercurial guage. Here we have the result of twenty observations, showing a diminution of 5·1 units of light for each equal to 1 inch of mercury diminution of pressure.

Third Series.

Pressure of air.	Illuminating power Observed.	Calculated.
30·2.	100·	100·
29·2.	95·0	94·9
28·2.	89·7	89·8
27·2.	84·4	84·7

These, then, being the results of the combustion of gas flames and candle flames in rarefied air, some questions naturally arise, as to what can be the cause of them? In answering this question, it would be well for us perhaps, for a moment or two, to glance at the conditions under which light is afforded by gas or candles. The light of these flames is due to two sources—viz, first to the incandescence of gaseous matters, and second, to the incandescence of solid matter deposited within the flame. Now, the light due to gaseous matter is so very slight—certainly it does not amount to more than 1 per cent. of the total amount of the ordinary gas or candle flame—that it may be left out of the consideration altogether. That light only comes into prominent play, when we come to very low degrees of pressure. Here is one of these gases, of which there are two, carbonic oxide and hydrogen, and you see we have a considerable flame with very little light. But, if we introduce into that flame some solid matter, which is capable of being heated to incandescence, we obtain at once a much more powerful light. We shall, in fact, feed this burner with precisely the same hydrogen gas as that from which the other burner is fed, and the only difference between the two experiments will be, that in this hydrogen flame, I have introduced a quantity of platinum wire coated with a little film of lime, obtained by burning paper within the cylinder of platinum wire, that has been immersed in a solution of chloride of calcium and subsequently dried.

Such being one condition for the production of a considerable amount of light in flame, it may be objected that, if we require solid particles of matter in flame—if we assume that we have them in ordinary flame—those solid matters ought to be capable of being perceived; that the flame, in fact, ought to be, to a certain extent, opaque, owing to the presence of those solid matters. Such, however, is not the case. To a certain extent, even a thick mass of flame is almost entirely transparent, if it is devoid of smoke. [The lecturer projected the image of a sheet of printed paper on to the screen by means of the electric lamp, and then introduced between the two a considerable body of gas flame, and showed that it did not in the slightest degree interfere with the reading of the letters.] This proves that a mass of flame which appears to have substance in it, is, to all intents and purposes, transparent. In fact, you may make the experiment for yourselves; for, if you hold a piece of printed paper behind a gas flame, you can read the letters through the thickest portion of that flame without difficulty.

But we may prove, in another way, by means of the electric lamp, that solid particles are carried across a perfectly transparent space. If we project the image of these carbon points, by which we obtain light, upon the screen, we shall see between them a perfectly transparent part apparently quite free from solid matter, but through which particles of solid matter in great numbers are constantly passing. [Experiment shown.]

These being, then, the general conditions upon which the light of flames depend, the first question which naturally arises to our minds is this—Is the combustion which takes place in rarefied air a perfect combustion; for, if it be an imperfect one, for a given quantity of materials consumed the light will be less than what ought otherwise to be obtained? I have, consequently, ascertained this with considerable care; and, having extracted the gases which were passing off from the flame in this apparatus, when the candle or gas was burning at ordinary atmospheric pressure, and again when burning at 8 inches pressure of mercury. I have found that in both cases the combustion was equally perfect; not a trace of carbon unconsumed escaped. Therefore, the combustion in rarefied and atmospheric air is the same; in fact, if I may be allowed to make use of the expression, the combustion in rarefied air is more perfect; there is a more complete combustion of the elements of the combustible materials into carbonic acid, water, and their final oxydized products. The question, then, whether the diminution of the light of a flame in rarefied air is due to imperfect combustion, must be answered in the negative.

The next question is—Is it caused by a diminution of temperature? I was at first inclined to this opinion. It is well known that, if you allow air to escape out of one vessel into another vessel containing rarefied air, or into another vacuous vessel, there is a considerable diminution of temperature in that vessel from which the air escapes; and, inasmuch as in the combustion of these flames, in rarefied air, the products of combustion fly asunder, there cannot be a doubt that the temperature does suffer in this way, and a diminution is the result. But, practically, it is very small, and the diminution of the temperature, from the causes just now mentioned, is neutralized to a great extent by the less amount of cooling effect of the atmosphere surrounding the flame. This question, therefore, must also be answered in the negative.

Now we come to the third question, viz.—Is the diminution of light due to the admission of atmospheric oxygen into the interior of the flame? If atmospheric oxygen can gain access to the interior of the flame, then it will undoubtedly have the effect of destroying those incandescent particles of carbon which are there present, and consequently of withdrawing from the flame the very source upon which 99-100ths of its light depends. Now, it is well known that air introduced into a gas flame has the effect of greatly diminishing the light. Here we have an ordinary gas flame giving the usual amount of light, the supply of gas to which passes along this tube and into the burner. We have here a second tube inserted into the gas tube, by means of which we can introduce atmospheric air. When we do so, the air commingles with the cold gas, and you will soon notice a very marked diminution in the flame. [Experiment performed.]

There is no doubt that this is the cause—the principal, if not the only cause of the diminution of light in the gas and candle flames. But how does the oxygen gain access to the interior of the flame in greater quantity in rarefied than in condensed air? The cause is easily explained. If you have very rarefied gas, the particles of that gas are capable of moving about in all directions with much greater facility than is the case with a dense gas. Hydrogen is very remarkable for this power of diffusing itself in other gas with which it is brought into contact. A jar of hydrogen, left with its mouth open to the atmosphere for a few minutes, will lose the whole of the hydrogen contained in it, and it will pass out into the external air, although the mouth of the jar may be downwards, and consequently the gas has to go out against its own comparative lightness—has to make its way against gravity downwards. So, too, when you have rarefied air, the particles of that air are far more mobile than air at ordinary pressure, and they gain access into the interior of the flame with greater facility. It is found, when a gas or candle flame burns at ordinary pressure in air, that 60 or 70 per cent. of nitrogen gains admission into the interior of the flame. So long as the flame remains blue, if you withdraw the gas from the base of the flame, you find oxygen present; it is only when you get into the higher luminosity of the flame that nitrogen exists. The presence of oxygen in any part of the flame determines the destruction of carbon in that part of the flame, and consequently those sources of light which exist in ordinary instances of incandescence.

This subject which I have brought before you is exceedingly simple, and

Price Current.

CASTINGS, per Ton.

Average Weight of Cast-Iron Gas-Pipes, per Yard.

1¼ in.	2 in.	2½ in.	3 in.	4 in.	5 in.	6 in.	7 in.	8 in.	9 in.	10 in.	12 in.
16	21	28	33	51	70	89	107	126	149	177	208 lbs.

Retail Prices are 5 to 10 per cent. higher.	London.	Glasgow.	Newcastle.	Wales.	Yorkshire, Derbyshire, and Staffordsh.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Pig Iron, No. 1	3 5 0	2 10 0	2 12 6	3 0 0	3 5 0
1¼ and 2 inches Socket-Pipes	7 0 0	6 0 0	6 5 0	6 10 0	6 15 0
2½ and 3 „ „	6 10 0	5 10 0	5 15 0	6 0 0	6 5 0
4 and 5 „ „	6 0 0	5 0 0	5 5 0	5 10 0	5 15 0
6 in. and upwards „	5 15 0	4 15 0	5 0 0	5 5 0	5 10 0
Retorts, 1st fusion, hot blast	5 10 0	4 10 0	4 15 0	5 0 0	5 5 0
„ 2nd „ cold „	6 10 0	5 5 0	5 10 0	6 0 0	6 5 0
Tank Plates, ⅜ thick and above	6 0 0	5 0 0	5 5 0	5 10 0	5 10 0

WROUGHT-IRON TUBING,

Subject to 40 per cent. Discount.

	2 in.	1½ in.	1¼ in.	1 in.	¾ in.	½ in.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Patent Welded Tubes, from 2 to 12 ft., perft.	1 8	1 0	0 10	0 7	0 5	0 4½
„ „ „ 6 in. to 18 in., each	3 0	2 0	1 9	1 3	1 0	0 9
Connecting-Pieces, or Long Screws	3 6	2 3	2 0	1 6	1 2	0 11
Bends, Springs, and Elbows—wrought iron	3 9	2 3	1 9	1 0	0 10	0 8
Tees, wrought or cast	4 0	2 6	2 0	1 6	1 1	0 10
Crosses, wrought or cast	4 6	3 0	2 6	2 0	1 6	1 2
Iron Cocks	17 6	9 6	7 6	4 6	3 3	2 6
„ with brass plug	28 0	16 0	13 0	7 0	5 6	4 6
Diminishing Sockets, Caps, Plugs, and	1 3	0 9	0 8	0 6	0 5	0 4
Plain Sockets [Nipples	1 0	0 8	0 7	0 5	0 4	0 3
Syphons, 2 quart	15 0	14 0	13 6	13 0	12 0	—

COALS, per Ton.

Newcastle.—Unscreened.		*Scotch Cannel.*	
Whitwell Primrose	6s. 9d.	Boghead, at Leith	45s. 0d.
Medomsley, Eighton Moor, and Burnhope	7 0	Kirkness, best	23 0
Pelaw	7 3	Capeldrae, 1st quality	20 0
New Pelton, Peareth, South Pelaw, Washington Hutton, and South Peareth	7 6	„ 2nd „	12 6
Pelton	7 9	Lesmahago, at Glasgow	25 0
Ramsay's Newcastle Cannel	16 0	„ „ Leith	27 6
		Arniston	27 6
		Wemyss	20 0
		Knightswood	18 0
		Pirnie	15 0

FREIGHTS.

Coastwise—Newcastle.—Per Ton.		*Foreign.—Per Keel.*	
Chatham & Rochester	8s. 3d.	Boulogne and Calais	£ 9 10 0
Cork	12 6	Barcelona	23 0 0
Dover	9 0	Bordeaux	16 0 0
Dublin	13 3	Cadiz	15 0 0
Exeter Quay	11 6	Copenhagen	9 0[0
Folkestone	9 0	Dieppe	10 5 0
London (Pool)	8 6 to 9 0	Genoa	22 0 0
Lowestoft & Yarmouth	6 6 to 6 9	Hamburg	9 17 6
Lynn	—	Havre	11 5 0
Portsmouth	10 6	Leghorn	20 0 0
Plymouth	11 0	Lisbon	16 0 0
Ramsgate & Margate	9 0	Rotterdam	—
Whitstable	8 6	Stettin	11 0 0
Weymouth	11 0	Trieste & Venice	25 0 0

SUNDRIES.

Best Newcastle Fire-bricks	per 1000	50s. 0d. to 55s. 0d.	
Cliff's Fire-bricks, at Wortley	per 1000	55 6	
Ingham's Fire-bricks, at Wortley	„	55 6	
Fire-clay Retorts	per foot run,	5s. 6d. to 7 0	
Tough Cake Copper	per ton	£102 10s.	
English Pig Lead	„	21 5	
Welch Bar Iron, in London	„	6 7 6	
Tarred Rope Yarn	per cwt.	26s. 0d.	
Foreign Spelter	per ton	£ 18 10 0	
English Block Tin	„	128 0 0	
Banca	„	127 0 0	

I have to apologize for bringing such a matter under your notice. I have done so only in the strong faith I have in the interest you feel in any scientific fact, however insignificant. Upon this faith, I throw myself entirely. I do not know that I can mention a single useful application which can be made of this law of the loss of illuminating power; but possibly, if we find that the effect extends upwards to higher pressures, some such application may be made. I have only been able as yet to make a few experiments in this direction, but, so far as they go, they seem to hold good for higher pressures. Of course, this question of the luminosity of flame did not escape Davy in his researches; he also noticed that the luminosity affected the rate of combustion, and that it was increased by additional pressure beyond that of the atmosphere. Finally, it is perhaps a simple and curious matter of calculation that, so far as my experiments have extended, it would require a pressure of upwards of 1000 atmospheres, before we got from the light of a candle the same intensity that we get from the electric light, which is so frequently used for experimental purposes.

A Good Receipt for Bronze.—A good bronze can be made for copper or brass by taking one drachm of sal ammoniac, fifteen grains of oxalic acid, and a pint of vinegar. After well cleaning the article to be bronzed, warm it gently, and brush it over with the liquid, using only a small quantity at a time. When rubbed dry, repeat the application till the desired tint is obtained.

The Manhattan Gas Company of New York.—This company now ranks fourth in the list of gas companies, being only preceded in importance by the Paris Company, and the Imperial and Chartered Companies of London. In 1860, the quantity of gas made was 936,615,000 cubic feet; the coal carbonized was 96,050 tons; the greatest quantity of gas made was on Nov. 15—3,917,000 cubic feet; and the greatest quantity sent out was 4,133,000, on Nov. 17; 932 retorts were then in action, of which three-fifths were clay; the public lamps in use are 9132; the increase in business in 1860 over 1859 was 12·7 per cent.; the extent of mains laid is 288 miles, of diameters varying from 3 to 20 inches; the average illuminating power of the gas was 15 sperm candles; and the average yield of gas was 9750 cubic feet per ton of coal.

Advertisements.

WORKMEN FOR ITALY.

So many Workmen having offered their Services to Mr. Bower, he finds it impossible to write to each, he therefore takes this mode of thanking Applicants, and to say that the number he requires has been made up.

Wanted to Purchase, Two good second-hand PURIFIERS, to suit a small Gas-Work.

Apply, stating size, price, &c., to Richard Thomas, Bridgwater.

Wanted to Purchase, Two Good SECOND-HAND PURIFIERS, size from 6 ft. × 4 ft. to 8 ft. × 6 ft.

Apply, stating price &c., to the Secretary, Market Rasen Gas Company.

TO GAS COMPANIES AND PROPRIETORS.

Wanted, the entire or partial MANAGEMENT of a Provincial Gas-Work, or LEASE of one; or the Advertiser would advance £500 to £1000 to enlarge any existing Work, and take proportionate profit and share of management.

Address by letter to A. B. B., care of Messrs. Chevalier and Co., 12, Bell Yard, Temple Bar, London.

TENDER FOR GASHOLDER.

The Directors of the Gaslight Com- PANY of ABERDEEN are desirous of obtaining TENDERS for the Supply and Erection of a GASHOLDER, 80 Feet Diameter by 22 Feet Deep, with Standards, Guides, &c., all in terms of Plan and Specification, which may be seen on application at the Company's Office.

Sealed Tenders, addressed to the Directors, and marked, "Tender for Gasholder," to be lodged on or before the 18th day of March next.

By order,
Geo. Gordon, Manager.

Gaslight Company's Office, Aberdeen,
Feb. 19, 1861.

Mirfield Gas Company.—Tenders for a GASHOLDER required, for the Mirfield Gas-Works, 100ft. diameter, and 40 ft. deep, in 2 lifts. Plans and Specifications to be seen at the Offices of the Company, on Saturday, the 9th day of March next, from 9 a.m. to 4 p.m.

Sealed Tenders, marked "Tender for Gasholder," to be sent in to the Offices of the Company, addressed to the Engineer, on or before Saturday, the 16th day of March. The lowest or any Tender may not be accepted.

Mirfield, Gas-Works, Feb. 23, 1861.

Gas-Fitting Business to be DIS- POSED OF, in consequence of the death of the Proprietor. Coming in for Tools and Stock, about £150.

For particulars, apply to Messrs. Hulett and Co., 55, High Holborn, London.

For Sale. At a reduced price. A SET of CIRCULAR DRY LIME PURIFIERS, capacity 40,000 ft. per hour, well adapted for the Oxide process; with 10 in. connexions, hydraulic valve, rotary lifting apparatus. Water Supply and Waste-pipes, &c.; together with Columns and Circular Iron Roofing.

The above, having been superseded by others of much larger capacity, will be disposed of on very reasonable terms.

To be seen at the Western Gas-Works, Kensal Green, London.

CLEGG ON COAL GAS.

Now Ready, price £1. 11s. 6d., cloth, the Third Edition, greatly enlarged, and with numerous additional Illustrations, of

A PRACTICAL TREATISE on the MANUFACTURE and DISTRIBUTION of COAL GAS, its Introduction and Progressive Improvement. Illustrated by Engravings from Working Drawings, with General Estimates. By Samuel Clegg, Jun., M. Inst. C.E.

London: John Weale, 59, High Holborn.

To be Sold—Four Dry-Lime Purifiers, each 7 ft. 8 in. × 6 ft. × 3 ft. 6 in., with 10 in. Water Lute, 8 in. Connexions, Centre Valve, and Lifting Crane, complete, and four tiers of Wrought-Iron Sieves.

Also a GASHOLDER, 50 ft. × 12 ft., with six Cast-Iron Columns and Guides, and counterbalanced at three points.

Also a GASHOLDER, 40 ft. × 12 ft., with four Cast-Iron Columns, triangular Wood Frames, and counterbalanced.

The above are all in good condition, and only parted with to make room for extensions.

For price and further particulars, apply to Mr. Hunter Jones, Gas-Works, Northampton.

W. C. HOLMES & CO.,
GAS ENGINEERS,
Whitestone Iron Works, Huddersfield.

Manufacturers of Gas Apparatus, Gasholders, Iron Tanks, Roofs, &c. &c.

Contractors for the Erection of Gas-Works throughout of any magnitude.

Plans, Specifications, and Estimates prepared.

Makers of the Combined, Condensing, and Purifying Apparatus (especially adapted for exportation), uniting simplicity and compactness with great efficiency and facility of working.

References given to Works where it is in operation.

South Metropolitan Gas.
LIGHT AND COKE COMPANY.

NOTICE is hereby given that an ORDINARY MEETING of the PROPRIETORS of this Company will be held at the London Tavern, on TUESDAY, the 2nd of April next, at Two o'clock precisely, to receive the Directors' Report and the Accounts of the Company for the half year ended December 31st last; to declare a dividend for the same period; and to elect one Director and one Auditor in the place of Benjamin Edgington, Esq., Director, and William Baker, Esq., Auditor, who retire from office agreeably to the Act of Incorporation, but, being eligible, offer themselves for re-election.

Any Proprietor holding forty shares, intending to become a candidate for either of these offices, must give notice in writing at the office of the company, at least fourteen days previously to the day of election.

By order of the Directors,
Thomas Livesey, Secretary.

Old Kent Road, March 11, 1861.

TO GAS COMPANIES, &c.

For Sale.—A Second-hand Cast- IRON TANK (good as new), 36 feet 6 inches by 12 feet deep, with Seven Cast-Iron Columns; 6-inch Inlet and Outlet Pipes complete.

Apply to George Cutler and Co., 8, Wharf, Wenlock Road, City Road, London.

GAS PURIFIERS FOR SALE.

The Committee of Management of the GREENOCK GAS-WORKS have for sale (deliverable in April next) FOUR DRY LIME PURIFIERS, each 13 feet 4 inches long, 8 feet 2 inches broad, and 4 feet 6 inches deep (inside measurements), with connexions, four tier of malleable iron sieves, wrought-iron covers, and lifting-crane; for all which they will be glad to receive Tenders. The purifiers are in excellent condition, are in constant use, and are to be parted with solely because the committee intend to procure others of a larger size.

Further particulars may be obtained on application to the Manager, by whom Tenders will be received till March 1, 1861.

The Committee do not bind themselves to accept the highest or any Tender.

Alexander Ritchie, Manager.

Gas-Works, Greenock, Jan. 12, 1861.

METROPOLITAN BOARD OF WORKS.
MAIN DRAINAGE OF METROPOLIS.
DEPTFORD PUMPING STATION.

To Builders, Contractors, and Others. —The Metropolitan Board of Works hereby give notice, that they will MEET at the Office of the Board, Spring Gardens, S.W., on Friday, the 12th day of April next, at Twelve o'clock at noon precisely, and will then be prepared to open TENDERS by parties who may be willing to CONTRACT for the CONSTRUCTION of Two Engine-Houses, Boiler-House, Chimney, Filth-Hoists, Coal Sheds, Dwelling-house, Iron Wharf Wall, Brick and Iron Sewers, and for the execution of other works in connexion therewith, on ground adjacent to Deptford Creek and the Greenwich branch of the South-Eastern Railway, in the county of Kent.

Parties desirous to submit Tenders may, upon payment of £1. 1s., obtain Plans, Sections, Specification, Form of Tender, and other particulars, on application to Mr. J. W. Bazalgette, Engineer of the Board, at the Office of the Board, Spring Gardens, between the hours of Nine a.m. and Four p.m., on and after Monday, the 4th of March next.

Tenders addressed to the Metropolitan Board of Works, must be delivered at the Office of the Board, Spring Gardens, S.W., before Four o'clock p.m. on Thursday, the 11th day of April next, and no Tender will be received after that hour.

The Board do not bind themselves to accept the lowest or any Tender, and the party whose Tender shall be accepted will be required to provide two approved sureties for the due performance of the works.

John Pollard, Clerk of the Board.

Spring Gardens, Feb. 26, 1861.

WOLVERHAMPTON RETORT WORKS.
ESTABLISHED **1840.**

JOHN EUNSON AND SON,
GAS ENGINEERS, AND MANUFACTURERS OF CLAY RETORTS,
AND FIRE GOODS IN GENERAL,

WOLVERHAMPTON.

Retort Mouthpieces, Bolts, Nuts, and every description of Wrought-Iron Work.

WILLIAM SUGG,

MANUFACTURER OF

PATENT DRY AND WATER GAS-METERS, TEST GASHOLDERS, AND APPARATUS,

"EVANS'S" PHOTOMETERS,

Experimental Meters, Minute Clocks, &c., Station Meters and Governors,

STREET-LAMP GOVERNORS AND LAVA BURNERS,

19 and 20, MARSHAM STREET, WESTMINSTER.

ADDISON POTTER,
WILLINGTON QUAY,
NEAR NEWCASTLE-UPON-TYNE,
Manufacturer of Clay Retorts, Fire Bricks, and every description of Fire Clay Goods.

JOSEPH CLIFF and SON,
FIRE-CLAY WORKS,
WEST DENTON, NEWCASTLE-ON-TYNE,
Manufacturers of Clay Retorts, Fire-Bricks, Lumps Tiles, &c.
The seam of Clay from which these goods are made is noted for its fire-resisting properties. Prices very moderate.
Office, 52, Quay Side, Newcastle-on-Tyne.

BELGIAN CLAY RETORTS.
ALBERT KELLER, Ghent.—The removal of the import duties on Earthenware permitting the entry of Clay Retorts into England, Albert Keller, of Ghent, begs to draw the attention of the Gas Companies of London, and other Cities, to the very superior quality of the RETORTS manufactured by him. They can be made of any size, in one piece, and of any form. The price will be in proportion to the weight, and very moderate in comparison to their value.
Communiations, addressed to ALBERT KELLER, GHENT, will receive immediate attention.

JAMES NEWTON,
(Established 1820,)
FIRE-BRICK AND TILE MERCHANT,
Wholesale and for Exportation,
FALCON DOCK, 78 AND 79, BANKSIDE,
SOUTHWARK, LONDON.
DEPÔT for STOURBRIDGE AND NEWCASTLE FIRE-BRICKS, LUMPS, TILES, and CLAY, and every Article suitable for
GAS AND WATER WORKS.

HARRIS and PEARSON,
PROPRIETORS OF
BEST CLASS-HOUSE POT AND CRUCIBLE CLAY.
MANUFACTURERS OF
FIRE BRICKS, GAS RETORTS, &C.
AMBLECOTE FIRE CLAY AND BRICK WORKS, STOURBRIDGE.
Late in the occupation of I. and W. King. Originally J. Pidcock, Esq.
NB. A quantity of best Clay Retorts in stock, viz.—Circulars, 14 inches, 15 inches. 16 inches.
D's, 16×12, 15×14, 20×16, 16×18.

WILLIAM STEPHENSON & SONS,
THROCKLEY,
NEWCASTLE-ON-TYNE,
MANUFACTURERS OF EVERY DESCRIPTION OF
FIRE BRICKS, CLAY RETORTS, LUMPS, TILES,
&c. &c.
LONDON OFFICES:
76, KING WILLIAM STREET, CITY.
A large stock of Fire-Clay Goods always on hand in London, at the lowest wharf prices, at Messrs CHRISTIE & Co.'s Wharf, 64, Bankside, SOUTHWARK.

STOURBRIDGE FIRE-CLAY WORKS.
E. BAKER and CO.
(Contractors to Government).
24 WHARF, HARROW ROAD, PADDINGTON, W.
Every article manufactured at their own Works and Mines, Brierley Hill.
FIRE-BRICKS, Lumps, Squares, Tiles, and Gas Retorts of all dimensions.
CRUCIBLE and CEMENT CLAYS.
GARDEN EDGINGS, of various patterns.
BUFF and ORNAMENTAL TILES.
CLINKERS and STABLE PAVINGS, noted for hardness and durability, being perfectly non-absorbent.
Shipments on the shortest notice.

F. SIMMONDS and SON,
RETORT AND BOILER-SETTERS,
AND CONTRACTORS FOR GAS-WORKS IN GENERAL, FOR MATERIALS AND LABOUR, OR LABOUR ONLY.
OFFICE:
2, YORK PLACE, KINGSLAND ROAD, N.E.
Contractors at the Chartered Gas-Works, Curtain Road, and numerous Provincial Gas-Works.

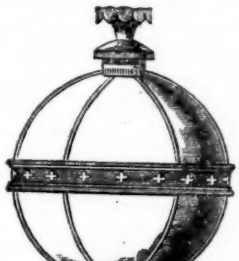
CAST-IRON Retorts, Socket Pipes, with Syphons and all requisite Connexions, Lamp Columns, Wrought Iron Tubing, Valves, Street Lamps, Sight Holes, Furnace Doors, Ash Pans, Charging and Coke Shovels, Iron Pails and Coke Barrows, Cross Bars, Fire Pots, Pumps, Iron Borings.
PURIFIERS, CONDENSERS, and SCRUBBERS erected complete, or the materials supplied; with every description of goods in use by Gas-Works, in stock, on wholesale prices, at
Mr. LYNCH WHITE'S,
Old Barge Iron Wharf, Upper Ground Street,
LONDON.

Now ready,
VOL. IX. of the JOURNAL of GAS LIGHTING, WATER SUPPLY, and SANITARY IMPROVEMENT, for 1860, price 21s., bound in cloth and lettered. A few copies of Vols. II., III., IV., V., VI., VII., and VIII. are still on sale.
W. B. KING, 11, Bolt Court, Fleet Street.

Just Published, price 3s., by Post, 3s. 2d.,
THE CHEMISTRY OF GAS LIGHTING,
with an Appendix containing a description of the different processes for the Manufacture of Colouring Matters from Coal Tar.
Re-arranged and reprinted from the JOURNAL OF GAS LIGHTING.
LONDON: WILLIAM B. KING, 11, BOLT COURT, FLEET STREET, E.C.

CAUTION.
TO GAS-METER MANUFACTURERS AND OTHERS.
THE Undersigned hereby caution Meter Manufacturers and others against infringing the exclusive right of the Undersigned to the use of the Screw Adjustment for regulating the Height of the Overflow-Pipes in Wet Gas-Meters, as described in the Specification of the Letters Patent granted to Crosley and Goldsmith on the 19th of April, 1856; as well as against infringing any other portions of that or any other Patent of the said William Crosley; and
NOTICE is further given, that all Infringers of the said Inventions, or any portions of them, will be proceeded against.
CROSLEY & CO.,
103, SOUTHWARK BRIDGE ROAD,
LONDON, Aug. 29, 1859.

Gas Stoves, Gas Baths, Gas Cooking APPARATUS, warranted the best in England, at PHILLIPS's, the original inventor and manufacturer, and general gas-fitter, &c., 55, Skinner Street, Snow Hill, LONDON, E.C.
PATENT SAFETY ATLAS CHANDELIERS, Sun and Star Burners, Outside Lamps, Patent Reflecting Lamps, Portable Coppers for either Gas or Fuel. Iron Tube and Fittings. Best quality for Gas, Steam, or Hot Water, &c. &c.

GLOBULAR LAMPS,
Ready Glazed, from 17s. 6d. each.

LAMP-POSTS
Of a Superior Class in Stock as well as the Ordinary Descriptions.
Engravings and Prices on application to
WILLIAM HOOD,
12, UPPER THAMES STREET, LONDON.

WILLIAM BLEWS AND SONS'
IMPROVED MACHINE-MADE BURNERS,
WROUGHT-IRON BATSWINGS,
FOR RAILWAY STATIONS AND MARKETS,
GAS-FITTINGS, CHANDELIERS,
BRASS AND IRON TUBES OF EVERY KIND
SUPPLIED ON THE BEST TERMS,
AT THE WORKS,
9, 10, 11, BARTHOLOMEW STREET,
BIRMINGHAM.

WALTER MABON, Engineer,
ARDWICK IRON WORKS, FAIRFIELD STREET
MANCHESTER,
Manufacturer of
IRON TANKS for Gasholders, Railway Stations, &c.
GASHOLDERS.—Extensive premises at Gorton, solely for the manufacture of Gasholders, and other heavy Wrought-Iron Structures.
GAS APPARATUS.—W. M. has an extensive assortment of patterns for Purifiers from 4 feet to 15 feet square, also round ones from 4 feet to 10 feet diameter; Scrubbers, Condensers, Washers, Columns, Girders, and Tripod Patterns, suitable for Gasholders, from 10 feet to 150 feet diameter, either Single-lift or Telescope. Contractor for Gas Works of any Magnitude. Designs, Specifications, and Estimates furnished.
WROUGHT and CAST IRON ROOFS for Railway Stations, Gas Works, Warehouses, and Sheds, prepared for Slates or for Corrugated Iron.
IRON HOUSES, either for Dwellings, Manufactories, or Public Buildings.
PIPES and VALVES, for Gas and Water, from 2 inches to 48 inches bore.

TO GAS COMPANIES AND CONTRACTORS.
FOR Sale, several lengths of Hydraulic MAIN, 14 inches diameter and 6 feet 9 inches long, with 7 holes for DIP-PIPES.
Also 4-inch ASCENSION-PIPES, and 3-inch ARCH and DIP-PIPES, and RETORT MOUTHPIECES, all in excellent condition, and will be sold at a very low price, and delivered, if required, at any Railway Station in London.
To be seen, on application to the ENGINEER, at the Equitable Gas Company's Works, Lupus Street, PIMLICO.

GEORGE BOWER,
GAS ENGINEER, MANUFACTURER,
AND CONTRACTOR,
ST. NEOT'S, HUNTS.
References to between 100 and 200 Gas-Works Designed and Erected by the Advertiser.

GEORGE CUTLER & CO.,
GAS ENGINEERS, &c.,
London Gasholder and Boiler Works,
8, WHARF, WENLOCK ROAD, CITY ROAD, N.,
LONDON.
Rye, Nov. 12, 1860.
Dear Sirs,—I consider it incumbent on me to acquaint you that the alterations recently made on the Rye Gas-Works—viz., the addition of a NEWLY-IMPROVED WASHER, and other work for the Purification of Gas, executed by the experienced workmen under your able supervision—are perfectly satisfactory to the Company, and the Gas is now as pure as it can be made.
I am, dear Sirs, your obedient servant,
CHARLES THOMAS, Superintendent,
Rye Gas-Works.
Messrs. Cutler and Co.

ROBERT MACLAREN and CO.,
EGLINTON FOUNDRY, GLASGOW,
Manufacturers of all sizes of Cast-Iron Main Pipes, by an improved Patent. General Ironfounders, Gas Engineers, and Wrought-Iron Tube Makers.

SAMUEL CUTLER, Gasholder
MAKER and CONTRACTOR
For Tanks, Roofs, Purifiers, Condensers, Erection and Alteration of Works and every description of GAS APPARATUS.
PROVIDENCE IRON WORKS,
MILL WALL, POPLAR. LONDON, E.
Main Laying and Gas-Works erected complete.

WEST and GREGSON, Gas-Meter
MANUFACTURERS, &c.
UNION STREET, OLDHAM.
Station and Experimental Meters, Gas Pressure Registers, Gauges, Experimental Gasholders, Governors, Slide Valves, &c. &c.
W. and G. would respectfully call the attention of Gas Engineers and Managers to their Station-meters, having made and erected the largest in use at the present time, two of which may be seen at the Stockport and Liverpool Gas Works, on application to the respective Engineers.

WHITEHOUSE and CO., Boiler and GASHOLDER MAKERS,
GLOBE PATENT TUBE WORKS
WEDNESBURY,
Beg to draw the attention of Engineers and Managers of Gas Works to the superior quality of the Article they manufacture, both in respect of the Iron employed, and the perfect manner in which it is welded; in proof of which they can refer to the testimonials of the most eminent Gas Engineers, and the experience of the principal of the large Gas Companies of the kingdom.
Orders promptly executed.

TO Mr. BENJAMIN WHITEHOUSE,
GASHOLDER MAKER,
WESTBROMWICH, NEAR BIRMINGHAM.
Sir,—I feel great pleasure in expressing my satisfaction at the manner in which you discharged your duties as CONTRACTOR for the TELESCOPIC GASHOLDER, 150 feet diameter and 60 feet deep, erected at this Company's Nine Elm Station in 1857. From that period to the present I have closely watched its working, and have never found the least defect either in workmanship or material.
During the recent heavy gales the Gasholder, although containing upwards of 1,000,000 cubic feet of Gas, showed no perceptible indications of its influence, but worked as freely and easily as usual.
RICHARD JONES.
Engineer to the London Gaslight Company.
Vauxhall, London, Nov. 9, 1859.

FLEXIBLE GAS TUBING,
VULCANIZED INDIARUBBER HOSE-PIPES,
WASHERS FOR STEAM-JOINTS, &c.
JAMES LYNE HANCOCK begs to inform the trade he has considerably improved the manufacture of his FLEXIBLE TUBING, both PLAIN and GLAZED. Made all sizes in 60 feet lengths.
INDIARUBBER GAS BAGS, fitted complete with Stop-Cocks and Tubes.
All orders to be addressed to JAMES LYNE HANCOCK, Vulcanized Indiarubber Works, Goswell Road, (opposite Spencer Street) LONDON (E.C.).

TRUSS'S PATENT ELASTIC PIPE-JOINT,

FOR GAS AND WATER-MAINS, AND STEAM PIPING,

Is the only PERFECT joint that has ever been constructed, and supplies the long-felt desideratum, by allowing for the expansion and contraction of metals, and for oscillation and deflection, without impairing the joint. Gas Companies will effect an incalculable saving in adopting it, as compared with the present imperfect mode of jointing.

Drawings, Estimates, and every particular, furnished on application to

THOMAS SEAVILLE TRUSS, C.E., 53, GRACECHURCH STREET, LONDON, E.C.

EDWARD COCKEY AND SONS' PATENT GAS VALVES.

These Valves are formed of two Cast-Iron Cylinders, with segmental divisions, having the faces ground gas-tight—the upper Cylinder turning horizontally on the lower one.

The lower Cylinder has pipes from each division, communicating with the vessels to and from which the gas is to be passed. The upper Cylinder has corresponding divisions, so arranged as to direct the passage of gas to the different segmental divisions in the lower part, and when it is turned on the face of the lower one, to alter the flow of gas from one vessel to another.

Each Valve has an index-plate provided, which is to be attached to the floor, and a pointer on the cover of the Valve shows which way it is turned. Thus, the Manager of the Works can at once see in which direction the gas is passing.

There are about fifty of these Valves now in use, of sizes varying from two to twelve inches, and they are giving great satisfaction. Amongst the Works at which they are fixed, the following may be mentioned:—

BASINGSTOKE.	CANTERBURY.	FROME.	RYDE.
BLANDFORD.	ENNISCORTHY.	GODALMING.	SANDWICH.
CHELTENHAM.	ELGIN.	NEWPORT.	WARMINSTER.

They are in course of erection at other important Works.

IRON WORKS, FROME SELWOOD.

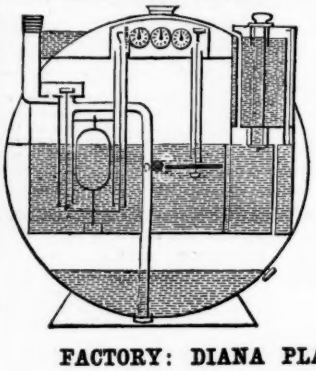
EDWARD COCKEY AND SONS

ALSO MANUFACTURE

PURIFIERS, SCRUBBERS, CONDENSERS, AND OTHER IMPROVED GAS APPARATUS,

HAVING PATTERNS SUITABLE FOR GAS-WORKS OF DIFFERENT SIZES.

PATENT WET METER.



N. DEFRIES,

CONSULTING GAS ENGINEER,

Inventor and Patentee

OF

WET GAS-METERS,

WITH SELF-ADJUSTING WATER-LINE;

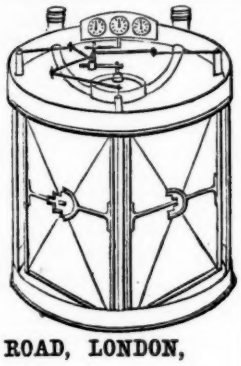
DRY METERS,

GAS-HEATING BATHS, OVENS, STOVES,

GAS FIRES with INDESTRUCTIBLE FUEL,

&c., &c.

PATENT DRY METER.



FACTORY: DIANA PLACE, FITZROY SQUARE. OFFICE: 406, EUSTON ROAD, LONDON,
Eight Doors from Factory.

Attempts having been made to construct Self-Supplying Apparatus to Wet Gas-Meters upon the Bird Fountain principle,—which, although unerring to supply water in the open atmosphere, has not wholly succeeded so as to be relied upon when enclosed in a Gas-tight Meter Case,—N. DEFRIES begs leave most respectfully to acquaint Gas Companies, and the Public in general, that he has constructed his PATENT WET GAS-METER upon a method entirely different, being founded on the well-known principle of the self-acting supply of the Oil Lamp, which has never been applied for the adjustment of the Meter Water-Line before, and which, by the admission of external air to a chamber sealed from Gas, will never fail to faithfully perform its required function. They are of the very best materials and workmanship, will stand more pressure than is required as the test for soundness by the New Act, are guaranteed to prevent surreptitious burning without detection, and will be kept in repair free of charge for seven years.

N. DEFRIES'S CELEBRATED DRY METERS,

of which more than 80,000 are in use in Palaces, Churches, Chapels, Royal Dockyards, Club Houses, Public Offices, and other Buildings throughout the Empire and Continent, which have done so much in checking surreptitious burning, and simplified the fitting up of Gas.

To remove any doubt of accuracy of measurement his Meter for 1500 lights, in use upwards of ten years at the Royal Italian Opera, until that Building was destroyed by Fire, was long afterwards dug out of the burnt ruins, then tested by the Chartered Gas Company in the presence of George Lowe, Esq., F.R.S., and other Chief Officers, and found inflexibly correct. Also, on the 9th of June, 1858, at the Western Gas-Works, his Meter for 150 lights, after considerable use, was doubted, and subjected to the most variable tests—from the full lighting to a single Jet—and in each case, as in other instances, accuracy was finely indicated.

As to durability, his two large Meters at the Thames Tunnel have been in use night and day for upwards of twelve years—one continuation of dark hours—subjected to the wear and tear of seventy-five years as compared with the ordinary business hours of using Gas above ground.

LORD REDESDALE'S SALE OF GAS BILL.

All Meters constructed by N. DEFRIES are guaranteed to pass the Provisions of the Standard.

No alteration has been necessary in the Meters he continues to supply to the Chartered, Imperial, City of London, Equitable, and other large Companies, his accustomed range of 1 per cent. over and under meeting all the desired requirements; whereas, by the New Act, a greater departure from accuracy—viz., 2 per cent. fast to 3 per cent. slow—is permitted.

PERRENS & HARRISON,

THE LYE FIRE-CLAY AND BRICK-WORKS, STOURBRIDGE,

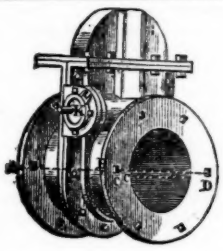
Successors to the late firm of J. and W. KING,

and Sole Proprietors of their well-known CLAY MINES, are prepared to supply

GAS-RETORTS, CLIFT'S PATENT GAS-OVENS and FIRE-BRICKS

OF ALL DESCRIPTIONS,

the superior quality of which will, they are confident, secure them further orders.



BRYAN DONKIN & CO.

keep always on stock their

IMPROVED GAS VALVES

from 2 inches to 18 inches, price 11s. 6d. to 13s. 6d. per inch diameter

List of prices, with full dimensions of all sizes up to 27 inches, to be had on application.

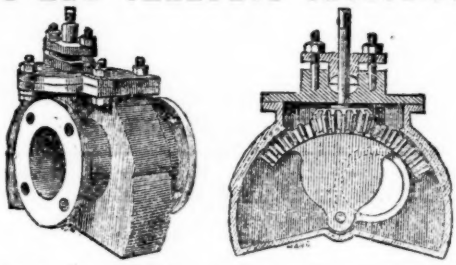
These Valves are all proved to 30 lbs. on the square inch before leaving the works.

BRYAN DONKIN & CO.,

ENGINEERS,

NEAR GRANGE ROAD, BERMONDSEY.

BEST AND CHEAPEST SLUICE-COCK.



BROWN AND MAY'S PATENT.

Above 3-inch diameter, price 10s. per inch. Brass face, 6d. per inch extra.

Can be taken to pieces without being removed from the line of Piping.

NORTH WILTS FOUNDRY, DEVIZES.

Wholesale Agents, Messrs. S. and E. RANSOME, 31, Essex Street, Strand, E.C., Where a Sample may be seen.

WALTER FORD,

LATE

PADDON and FORD,

GAS-METER AND APPARATUS WORKS,

GRAY'S INN ROAD, LONDON.

MANUFACTURER OF WET AND DRY GAS-METERS, STATION-METERS, GOVERNORS, &c. &c.

A large number of **STATION-METERS,** up to 80,000 feet per hour (being by far the largest in use), and **GOVERNORS** for **MAINS,** up to 24 inches, have been constructed by Paddon and Ford. These Meters and Governors possess peculiar advantages as regards strength and freedom of action.

Sole Manufacturer of **PADDON'S PATENT STREET-LAMP REGULATORS,** for insuring any required consumption. These Regulators are in general and increasing use, and references can be given to Gas Companies who use them for every Lamp.

JOSEPH BOULTON,

28, BAGNIGGE WELLS ROAD, CLERKENWELL,

PATENTEE OF

DRY & IMPROVED WET GAS-METERS,

AND

GAS APPARATUS.

All Meters warranted to comply with the Act of Parliament.

F. & C. OSLER,

45, OXFORD STREET, LONDON;

Manufactory—Broad Street, Birmingham—Established 1807,

MANUFACTURERS OF GLASS CHANDELIERS, GLASS LUSTRES, TABLE GLASS, &c. &c.

ELEGANT CRYSTAL GLASS CHANDELIERS, for GAS, from £4 upwards (Made from "REGISTERED" DESIGNS), with GLASS BRANCHES, &c.; suitable for DRAWING-ROOMS and BALL-ROOMS. The more extensive use of GAS in private dwellings has induced Messrs. OSLER to direct their particular attention to the manufacture of this class of articles—which, with a view to their general adoption, are offered at very moderate prices. Purchasers can select from a great variety of patterns, to which additions are being constantly made.

THEATRES, CONCERT, ASSEMBLY, AND BALL ROOMS LIGHTED BY ESTIMATE ON THE LOWEST TERMS.

JAMES OAKES and CO.,

ALFRETON IRON WORKS, DERBYSHIRE,

AND

WENLOCK IRON WHARF, 20, WHARF ROAD, CITY ROAD, LONDON,

Beg to inform Gas and Water Companies and the public, that they keep in stock in London all the CASTINGS in general use in Gas and Water Works, including best cold-blast Iron Retorts, Socket and Flange Pipes of all sizes, Bends, Branches, Syphons, Lamp Columns of various patterns, &c.

N.B.—Orders for Cast-iron Tanks, Girders, Columns, Cylinders, and all irregular castings, will have immediate attention.

CHARLES HORSLEY, Agent.

C. H. is prepared to carry out the warming and ventilation of public buildings, &c.; also civil engineering in general.

BIRTLEY IRON WORKS,

CHESTER-LE-STREET,

DURHAM.

Manufactory for every description of Casting and Machinery for Gas Works and Water Works.

Warehouse in London for Cast-iron Pipes and Connections of all sizes and in any quantity, Scott's Wharf, Bankside, Southwark.

Office in London, Mr. E. M. PERKINS, 78, Lombard Street.

JOHN ROGERSON and CO.,

NEWCASTLE-ON-TYNE & MIDDLESBRO'-ON-TEES.

Wrought and Cast Iron Pipes, Cast-Iron Retorts, and all kinds of Foundry Work necessary for Gas-Works. Fire-Bricks and Clay Retorts. Gas Coals of every description. Pig, Bar, and Plate Iron.

LONDON HOUSE:

12, ROYAL EXCHANGE BUILDINGS.

WROUGHT-IRON Guides for Gas-HOLDERS, when Trussed upon scientific principles, are more capable of resisting strains, in every direction, than Cast Columns of any form can be; and weigh only one-fifth as much as the latter. Designs and Working Drawings for Guides and Ties can be obtained of the Inventor, CHARLES DIXON, C.E., Chichester, SUSSEX.

GAS COAL.

BEAL, WALKER, and CO., Coal and COKE MERCHANTS, No. 1, Walker's Buildings, SHEFFIELD, beg to inform the Directors and Managers of Gas Companies, that they are in a position to contract for the supply of the different sorts of best Gas Coal, such as best Silkstone, Barnsley, and others, at the lowest prices, which may be had on application at the above Office.

ALFRED PENNY, Gas and CONSULTING ENGINEER,

WENLOCK IRON WORKS,

21 & 22, WHARF ROAD, CITY ROAD, LONDON.

Mr. PENNY having had a large experience in the construction, alteration, and management of Gas-Works, begs to inform the Directors of Gas Companies that he may be consulted on all matters appertaining thereto. He also manufactures Gasholders, Purifiers, and all the various apparatus used in Gas-Works, and keeps in stock Retorts and Mouthpieces, Socket-Pipes, Bends, Branches, T-pieces, &c. &c.

Plans, Specifications, and Estimates prepared.

JOSEPH WILLCOCK

(late BARLOW and CO.),

Mechanical and Architectural Draftsman, Designer, Surveyor, and Lithographer to Gas Engineers and Gas Apparatus Manufacturers, formerly Superintending Engineer at the largest Gas Apparatus Manufactory on the Continent.

Patent and Designs Office, 89, Chancery Lane, LONDON, W.C.

GEORGE ANDERSON, Gas and CONSULTING ENGINEER,

104, LEADENHALL STREET, LONDON (E.C.).

DIRECT-ACTING GAS-EXHAUSTERS,

supplied either with or without Steam-Engines and Boilers.

FOUR-WAY DIAPHRAGM VALVES,

one of which answers the purpose of THREE ordinary Valves, as applied to Purifiers, or in shutting off and passing Station-Meters, Governors, or other apparatus, while the Connecting-Pipes are also much simplified.

RETORT SETTINGS,

designed to be heated by Tar alone, and with a total absence of Smoke.

Illustrated circulars, giving references and every information, may be obtained on application as above.

BENJAMIN GIBBONS, Jun.,

DEEPDALE FIRE-CLAY & BRICK WORKS,

Near DUDLEY,

Manufacturer of every description of Fire-Bricks, Lumps, Quarries, Shields, Flue Covers, &c., to any size or shape required.

FIRE-CLAY RETORTS,

TO MODEL OR DRAWING.

B. G. begs to call the attention of Gas Companies to his Fire-Clay Retorts, which have been used with great satisfaction in some of the largest Gas-Works in the Metropolis and many Provincial Towns in England.

References given, if required.

WILLIAM INGHAM AND SONS,

WORTLEY FIRE-BRICK AND RETORT WORKS,

Near

Leeds.

W. INGHAM and SONS, having for many years been extensively engaged in the Manufacture of

RETORTS AND FIRE-BRICKS FROM THE CELEBRATED WORTLEY FIRE-CLAY,

beg to call especial attention to their RETORTS, which have for many seasons proved to be unsurpassed in quality by any in the Kingdom, their FREEDOM FROM CRACKS and the ADHESION OF CARBON rendering them worthy the attention of all parties interested in the making of Gas.

The Works are of such magnitude as to ensure the prompt execution of orders to any extent.

Estimates for Setting, or Bricklayers sent when required.

GAS OVENS IN SEGMENTS OF EQUAL QUALITY.

A large stock of Fire-Bricks, Fire-Clay, Terra Cotta, and Drain-Pipes of all sizes kept in London at CHRISTIE & CO.—Wharf, 64, Bankside, Southwark, where all particulars of Prices, &c., may be obtained.

N.B.—*Export orders continue to have prompt attention.*

LIVESEY FIRE-CLAY WORKS,

NEAR BLACKBURN, LANCASHIRE.

ORLANDO BROTHERS,

MANUFACTURER OF PATENT CLAY RETORTS,

AND EVERY DESCRIPTION OF

TUBULAR GLAZED SEWERAGE PIPES, BENDS, JUNCTIONS, ETC.

FIRE-BRICKS, TILES, BLOCKS, AND CHIMNEY-TOPS.

WILLIAM PARKINSON AND CO.,

(SUCCESSORS TO THE LATE SAMUEL CROSLEY,)

COTTAGE LANE, CITY ROAD, LONDON, E.C.

Established 1816.

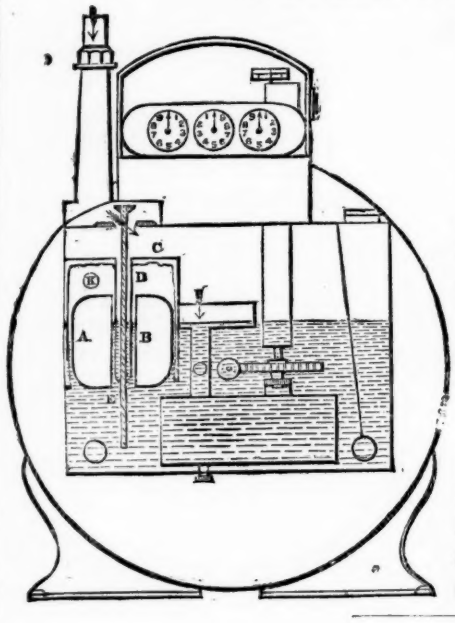
PATENTEES AND MANUFACTURERS OF

STATION-METERS & GOVERNORS,

CONSUMERS' METERS & GOVERNORS,

AND OTHER GAS APPARATUS. Also,

METERS FOR MEASURING WATER.



IMPROVED LOW-SPOUTED GAS-METER,

WITH

NEW PATENT FLOAT ARRANGEMENT.

The Float A is partitioned off from the front frame considerably below the water-line, and is pierced perpendicularly by a tube B.

A large gas-way, C, is left between the top of the partition and the valve-seat. The small tube D, in which the float-wire works, is fixed to the top of the partition, and comes down below the water-line inside the tube B. The float-wire is soldered to the float at E, so as to allow water to pass into the tube D, in order to seal it. The chamber above the float is open to the outlet through the hole K.

The action of this float is exactly opposite to that of ordinary meters. The float is elevated by sudden pressure, and the valve cannot be closed except through want of water.

W. P. and Co. beg especially to call the attention of Gas Companies and others to this New Patent Meter, which entirely overcomes the difficulty experienced by ordinary wet meters, owing to the short range of the float, which is necessary in order to meet the requirements of the "Sale of Gas Act."

They are prepared to supply

TEST GASHOLDERS,

of the most approved description, graduated by the Standard.

CROSLEY & GOLDSMITH'S

PATENT SELF-ADJUSTING & COMPENSATING GAS-METERS

CANNOT BE OVER OR UNDERCHARGED WITH WATER,

and they consequently register the quantity of Gas consumed with greater accuracy than Meters in which the Water-Line is variable.

MANUFACTURED BY

CROSLEY & CO.,

GAS-METER MANUFACTURERS,

103, SOUTHWARK BRIDGE ROAD, LONDON, S.E.

N.B. The Patent Self-Adjusting and Compensating Apparatus may be applied to the ordinary Meter.

Manufacturers of LOWE'S PATENT MOTIVE-POWER METER, for situations where there is an inadequacy of pressure to supply the special requirements of certain consumers in low grounds during the day or night.

Also, Manufacturers of EXPERIMENT METERS, GOVERNORS, MINUTE-CLOCKS, PHOTOMETERS, &c., &c., similar to those used by Mr. King, of Liverpool.

CROSLEY & CO. are also prepared to supply Gas Companies and others with

DUPLICATES of Mr. KING'S CUBIC FOOT TRANSFERRER,

similar to that manufactured by them, and verified by the ASTRONOMER ROYAL, and PROFESSOR MILLER, of Cambridge, on behalf of the Government, which was deposited by C. & Co. in the Office of the COMPTROLLER-GENERAL of the EXCHEQUER before Nov. 13, 1859, in compliance with the "Act for Regulating Measures used in Sales of Gas." They also supply

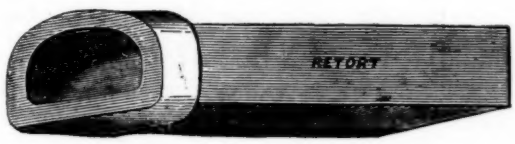
TEST GASHOLDERS,

Graduated by the Standard Cubic Foot.

C. and Co. are the only house in the trade which has for years manufactured Meters according to the standard measure set forth in the 2nd Section of the "Sale of Gas Act," and which also comply with the rules laid down in the Section for testing meters. Purchasers of C. and Co.'s Meters may therefore be secured against any additional expenses being incurred in order to adapt their Meters to the requirements of the new Act.

KING BROTHERS,

STOURBRIDGE FIRE-BRICK AND RETORT WORKS.



KING BROTHERS beg especially to call the attention of Gas Companies to the superiority of their Retorts, which are made from the celebrated STOURBRIDGE FIRE-CLAY. Mr. King has patented a Kiln for burning Retorts, by which Patent all Cold Air is excluded from the Kiln while burning, thus rendering them FREE FROM CRACKS AND CORRECT IN FORM. By great care in Manufacturing, combined with the advantages in burning, a VERY SMOOTH SURFACE is obtained, rendering them less liable to carbonize.

Retort Ovens, Fire-Bricks, Guards, Saddles, Rabbitted Burs, Flues, and Quarries, are all Manufactured of the same quality of Clay.

Every Retort and Brick is branded "King Brothers, Stourbridge."

FIRE-CLAY GAS RETORTS.

ESTABLISHED IN 1795.

JOSEPH CLIFF,

WORTLEY FIRE-BRICK WORKS, near LEEDS.

THESE RETORTS are unrivalled in excellence, being the BEST FINISHED INTERNALLY, and THE MOST CORRECT IN FORM, of any in the Kingdom. From the peculiar composition used in working up the face of the material, they are rendered unusually smooth, close, and FREE FROM SURFACE CRACKS, thus, in a great measure, preventing leakage and the adhesion of carbon to their interior surface.

To meet the yearly increasing demand of UPWARDS OF THIRTY SEASONS and to carry out the late improvements in the manufacture, the Premises have been re-erected and much enlarged, and Engineers may rely WITH CONFIDENCE on their orders being completed with a greater regard to despatch than by any other House.

THE WORKS ARE WELL SITUATED

For EXPORT from the Ports of { LONDON, LIVERPOOL, HULL, MIDDLESBRO', HARTLEPOOL, and STOCKTON.

FIRE-BRICKS, LUMPS, GUARDS, TILES, AND CLAY OF THE SAME QUALITY.

M B NEWTON, London Agent, No. 4, Wharf, King's Cross Goods Station.

SALE OF GAS ACT.

MESSRS. CROLL, RAIT, AND CO.,

Manufacturers of Croll's Patent Improved

DRY GAS-METER,

Also Manufacture and Supply

TEST GAS-HOLDERS,

And other Apparatus required by the Inspectors appointed in pursuance of the above Act.

Application for particulars to be made to the Factory,

CANAL BRIDGE, KINGSLAND ROAD, LONDON, N.E.

ALEXANDER WRIGHT,

55 and 55A, MILLBANK STREET, WESTMINSTER, S. W.,

MANUFACTURER OF

CONSUMERS' COMPENSATING & NON-COMPENSATING WET GAS-METERS,

Of the best material and workmanship, carefully adjusted to meet the requirements of the SALES OF GAS ACT.

STATION-METERS & GOVERNORS,

WRIGHT'S REGISTERING PRESSURE-GAUGE, EXHAUSTER REGISTER, & REGULATOR;

STANDARD TEST GASHOLDERS;

Consumers' Governors; Inspectors' Pocket, King's, and all other kinds of Pressure-Gauges; Thermometers for Condensers, Pressure Registers, &c., &c.

EXPERIMENTAL TESTING APPARATUS,

Employed by the best experimenters in this country and on the continent, and by the Gas Testers in the London districts.

PHOTOMETERS, SPECIFIC GRAVITY APPARATUS, BI-SULPHURET OF CARBON TEST, THOMPSON'S BROMINE AND HEATING POWER OF FUEL TESTS, IMPROVED ALKALIMETER, EXPERIMENTAL METERS AND GOVERNORS, MINUTE CLOCKS, &c., &c.

"Analysis of Gas for Practical Men," by A. WRIGHT, M. Inst. C.E., post-free for 13 Stamps. PRICE-LISTS ON APPLICATION.

JAMES MEACOCK,

PATENT DRY AND WET GAS-METER MANUFACTURER,

7, SNOW HILL, AND 16, WEST STREET, LONDON.

ESTABLISHED 1836.

J. M. invites attention to his Improvements in EXPERIMENTAL WET GAS-METERS, by which he renders impossible any Leakage from the Stuffing-Box.

These METERS are GUARANTEED to meet all the Requirements of the SALE OF GAS ACT

GOVERNORS, STATION-METERS, PHOTOMETERS,

EXPERIMENTAL TESTING GASHOLDERS, HIGH-PRESSURE GAUGES,

AND ALL APPARATUS IN USE AT THE GAS MANUFACTORY.

D. HULETT and CO., 55 and 56, HIGH HOLBORN, LONDON,

PATENTEES and MANUFACTURERS of the ONLY GOOD MERCURIAL GAS REGULATOR,

invite the attention of Gas Companies and the Trade generally to their Improved GAS-METERS, which they warrant equal to any in Quality, Workmanship, and Simplicity of Construction, and the only Meters from which Gas cannot be obtained without being duly registered.

MANUFACTURERS OF

GAS CHANDELIERS, GLASS LUSTRES, HALL LANTERNS, VESTIBULES, BRACKETS, PENDANTS;

DOUBLE CONE, ALBERT, SHADOWLESS, & EVERY DESCRIPTION OF BURNER, UNION JETS, BATSWINGS, ETC.;

IMPROVED FULL-WAY CARTER'S VALVES (much approved of);

GAS-STOVES, and every article connected with Gas Apparatus.

CAST & WROUGHT-IRON PIPE, BLACK & GALVANIZED. COPPER. TIN, BRASS, & COMPOSITION TUBING.

D. HULETT'S IMPROVED SERVICE CLEANSER

for clearing out Mains, Services, and Interior Fittings—60s. net.

Boyle's Patent Silvered Glass Combination Reflectors and Outside Lanterns.

Sole Manufacturers of Church and Mann's Photometer.

Large Pattern Books, with every description of Gas-Fittings, Chandeliers, &c., with complete Book of Prices, 12s.

London: Printed by WILLIAM BOUGHTON KING (at the office of Joseph Clayton, 17, Bouverie Street, Fleet Street); and published by him at No. 11, Bolt Court, Fleet Street, in the City of London.—Tuesday, March 12, 1861.